

TRAFFIC IMPACT STUDY

PROPOSED MIXED USE DEVELOPMENT

Harbour Isle, Windmill Road, Dartmouth, NS



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1.0 Introduction

Background

Elm Developments Corp. is preparing plans for completion of the *Harbour Isle* mixed use development on a site on Seapoint Road adjacent to Windmill Road, Dartmouth (Figure 1). The development, which now has an 89 residential units and 4,500 SF of commercial space (Building 1), also has approval to add 210 units (Buildings 2 and 3). Development of the commercial sites on Marketplace Drive, which now includes a Starbucks restaurant, is considered to be as-of-right. Additional development includes 315 residential units (Buildings 4, 5, and 6), an approximately 100,000 square foot (SF) office tower, a 175 room hotel, and a 4,812 SF restaurant. Build-out of the development is expected to be completed by 2026.

WSP Canada Inc. has been retained to complete a Traffic Impact Study for the proposed additional developments to satisfy the requirements of Halifax Regional Municipality (HRM).

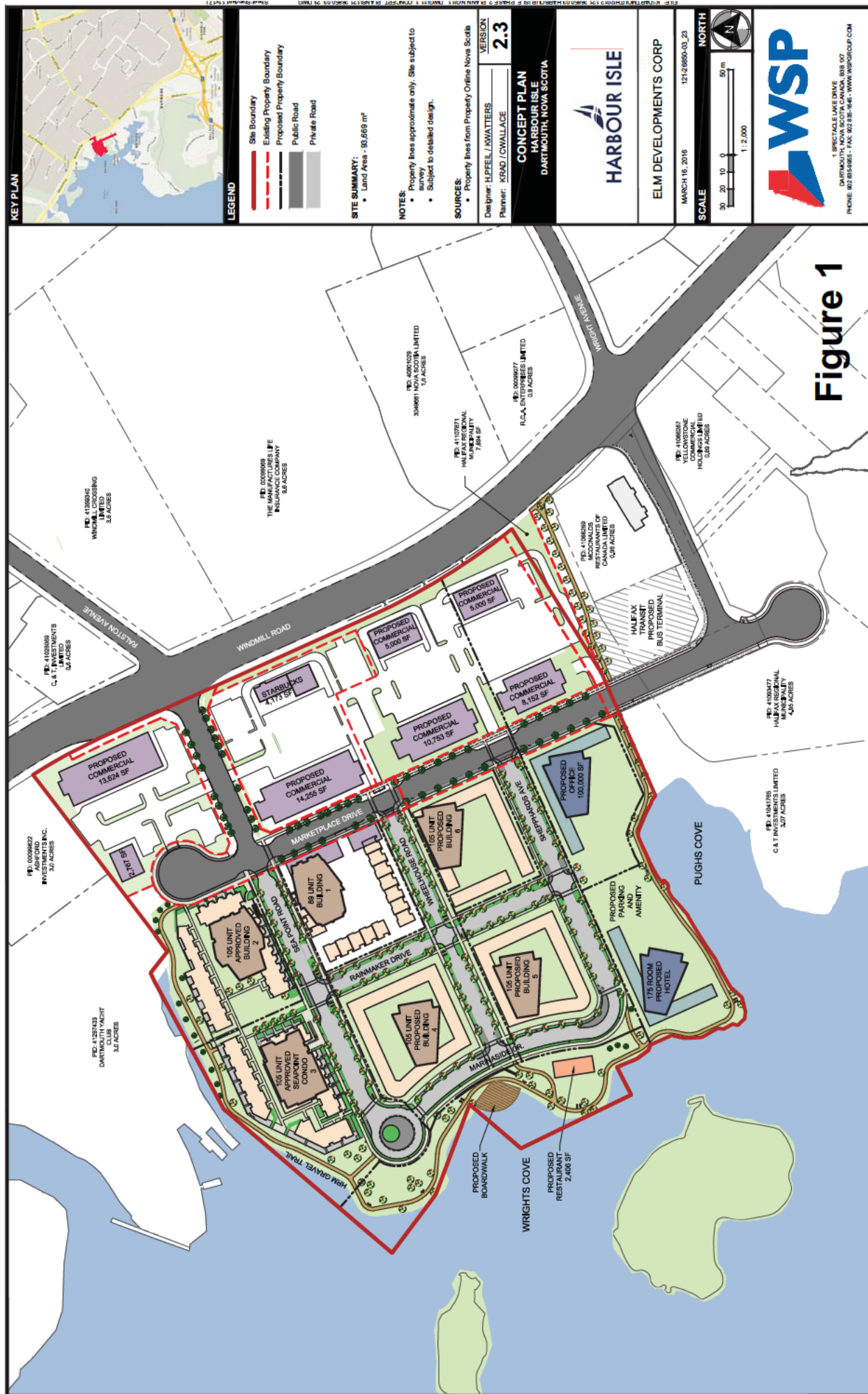
A Traffic Impact Study Usually Considers Four Questions

A Traffic Impact Study usually consists of determining answers for the following questions:

1. **What are the existing traffic situations** on the street adjacent to the study site?
2. **What traffic changes are expected** at Study Area intersections? How many vehicle trips will be generated by the proposed development during weekday peak hours? How will the traffic be distributed to Study Area streets and intersections?
3. **What traffic impacts will occur** on Study Area streets and intersections? How will level of service be affected?
4. **What road or intersection improvements are required** to mitigate project impacts on Study Area traffic movements?

Study Objectives

1. Obtain AM and PM peak hour traffic counts for Windmill Road intersections at Seapoint Road / Ralston Avenue and Wright Avenue / Bancroft Drive.
2. Complete trip generation estimates for the multi-unit residential Buildings 2 and 3, and the as-of-right development on Marketplace Drive.
3. Determine projected 2026 background AM and PM peak hourly volumes at the two study area intersections that include normal annual volume growth plus assigned trips from completion of the approved and as-of-right developments.
4. Estimate the number of AM and PM trips that will be generated by the proposed multi-unit residential buildings (Buildings 4, 5, and 6), and office, hotel, and restaurant developments.
5. Distribute and assign site generated trips to the two Study Area intersections and add them to 2026 background volumes to provide projected 2026 volumes that include site build-out trips.
6. Evaluate the performance of the Study Area intersections.
7. Recommend street and intersection improvements that may be required to mitigate impacts of site generated traffic.



2.0 Study Area - Approved and As-of-Right Developments

Description of Site Access Intersections

The proposed development (Figure 1) will access Windmill Road at the existing Seapoint Road intersection, as well as by extension of Marketplace Drive south to Bancroft Drive to access Windmill Road opposite the Wright Avenue intersection.

Transit Service to Serve in the Study Area

Windmill Road is served by Metro Transit routes 51, 64, 85, 87, and 185, which provide connections to other routes at Transit and Ferry Terminals. Also, Halifax Transit is considering the potential for a Transit Terminal just north of the intersection of Marketplace and Bancroft Drive.

Manual Turning Movement Counts

Study area intersection turning movement counts obtained on December 16 and 17, 2015, captured the vehicle trips generated by existing Harbour Isle developments. Counts obtained at the following Windmill Road intersections are tabulated in Appendix A with AM and PM peak hours indicated by shaded area:

- Seapoint Road / Ralston Avenue (Table A-1); and
- Bancroft Lane / Wright Avenue (Table A-2).

The 2015 turning movement volumes have been increased by an annual volume growth rate of 0.5%, which is considered reasonable for this location, to provide projected 2016 AM and PM peak hourly volumes which are illustrated diagrammatically on Figure A-1, Boxes A and B.

Projected 2026 Background Volumes that Include Approved and As-of-Right Developments

The following are included in projected 2026 background traffic for the proposed additional development considered in this Study:

- Normal annual traffic volume increases;
- Trips generated by approved Buildings 2 and 3; and
- As-of-right development on Marketplace.

Annual Volume Increases - An annual volume growth rate of 0.5% has been used to project normal 2026 background traffic volumes without added development.

Approved Development - Trip generation estimates for the approved development of multi-unit residential buildings with a total of 210 units have been included.

As-of-right Development - The as-of-right development on Marketplace is expected to include approximately 59,551 SF of commercial space in addition to the existing 4,173 SF Starbucks building (Figure 1).

Trip Generation Estimates for Approved and As-of- right Developments

Trip generation estimates, prepared using published trip generation rates from *Trip Generation, 9th Edition* (Institute of Transportation Engineers, Washington, 2012), are included in Table 1. It is estimated that the proposed 210 residential units and 59,551 SF of commercial space will generate about 144 two-way vehicle trips (61 entering and 83 exiting) during the AM peak hour and 236 two-way vehicle trips (116 entering and 120 exiting) during the PM peak hour.

***Trip Generation
Estimates for
Approved and As-of-
right Developments
(Continued)***

On-site synergies, or cross shopping trips, represent trips completed by vehicles accessing multiple land uses on the site. For this analysis, cross shopping trips have been assumed to represent 10% of trips to the proposed development.

Two types of trips are included in the external trips that will be generated by the proposed commercial developments: Pass-by and Primary Trips.

Pass-by trips are those which are made as 'intervening opportunity' stops to commercial and retail land uses for vehicle trips already passing by the site. Although these trips will be included in the driveway volumes to the site, they will not increase the overall traffic volumes on Windmill Road. The site will be exposed to pass-by traffic volumes during AM and PM peak periods. For this analysis, it has been assumed that 20% of the external commercial site trips will be pass-by trips of vehicles already traveling on Windmill Road. It is estimated that pass-by trips will account for 8 vph entering and exiting the site during the AM peak hour and 16 vph entering and exiting during the PM peak hour.

Primary trips for this Study include all external site generated trips that are not considered as pass-by trips. After adjustment for 10% cross shopping trips and 20% pass-by trips, the estimated number of primary trips generated (Table 1) by the proposed development include 119 two-way vehicle trips (48 entering and 71 exiting) during the AM peak hour and 188 two-way vehicle trips (93 entering and 95 exiting) during the PM peak hour.

Table 1 - Trip Generation Estimates for Approved and As-of-Right Developments									
Land Use ¹	Units ²	Trip Generation Rates ³				Trips Generated ⁴			
		AM Peak		PM Peak		AM Peak		PM Peak	
		In	Out	In	Out	In	Out	In	Out
High Rise Apt (Land Use 222)	210 Apts	0.075	0.225	0.21	0.14	16	47	45	29
Specialty Retail (Use Code 826) ⁵	59.551 KGLA	0.76	0.60	1.19	1.52	45	36	71	91
Trip Generation Estimates for Approved and As-of-right Developments						61	83	116	120
Less 10% for On-site Synergy (Specialty Retail)						5	4	7	9
Estimated External Site Generated Trips						56	79	109	111
Reduction of 20% Pass-By for Specialty Retail						8	8	16	16
Primary Trip Estimates for Approved and As-of-right Developments						48	71	93	95
NOTES: 1. Land Use Codes are from <i>Trip Generation, 9th Edition</i> , Institute of Transportation Engineers, Washington, 2012. 2. 'Number of residential units' for Apartments; 'Gross Leasable Area x 1000 square feet' for Specialty Retail; and 'Gross Floor Area x 1000 square feet' for Office space. 3. Trip generation rates are 'vehicles per hour per unit' for Apartments and 'vehicles per hour per 1000 sq. ft.' for Commercial space. 4. Trips generated are 'vehicles per hour' for AM and PM peak hours. 5. Specialty Retail (Land Use 826) rates have been used. Since there are no published rates for the AM peak hour for this Land Use, and since AM peak hour trips to Specialty Retail are generally lower than PM rates, AM trip rates have been assumed to be 50% of the PM rate with reversal of the directional split.									

***Distribution and
Assignment of
Approved and
As-of-right Trips***

Pass-by trips have been assigned to site accesses in accordance with existing through volumes on Windmill Road. The following trip distribution percentages, based on local knowledge of the area and existing traffic volume characteristics at Study Area intersections, have been used to distribute and assign primary trips to site access intersections:

- North - 30%
- East - 30%
- South - 40%.

Assigned AM and PM peak hourly volumes are illustrated diagrammatically in Figure A-1, Boxes C and D.

***Projected 2026
Background
Volumes without
Highway 107***

Trips generated by 210 approved apartment units and 59,551 SF of as-of-right development (Figure A-1, Boxes C and D) have been added to projected 2026 volumes that include 0.5% annual traffic volume growth to provide estimated 2026 AM and PM peak hourly background volumes for this Study that include approved and as-of-right development (illustrated diagrammatically in Figure A-2, Boxes A and B).

***Estimated Traffic
Diversion from
Windmill Road to
Highway 107***

Since the mid-1980s, the Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) has been planning for the completion of a section of Highway 107 from its present terminus in Burnside at Akerley Boulevard to Duke Street and Highway 102 in Bedford. Since the road section is expected to be completed by 2026, traffic diversion from Windmill Road to Highway 107 has been considered in this Study. *Traffic Study for Highway 107 Phase 1 - Burnside to Sackville* (WSP Canada Inc., 2011) has been reviewed to determine the impact of the highway extension in reducing peak hour traffic volumes in the study area. It was determined that the completion of Highway 107 is expected to reduce through volumes on Windmill Road, as well as turning volumes between Wright Avenue and Windmill Road north.

Estimated diverted AM and PM peak hourly volumes are illustrated diagrammatically in Figure A-3, Boxes C and D.

***Projected 2026
Background
Volumes which
include Traffic
Diversion to
Highway 107***

Estimated trips diverted from Windmill Road study area intersections to Highway 107 (Figure A-3, Boxes C and D) have been subtracted from the projected 2026 background volumes without Highway 107 (Figure A-2, Boxes A and B) to provide estimated 2026 AM and PM peak hourly background volumes for this Study that include consideration of traffic diversion to Highway 107 (illustrated diagrammatically in Figure A-4, Boxes A and B).

3.0 Trip Generation, Trip Distribution and Assignment

**Description of the
Proposed
Development**

The proposed development (Figure 1) includes 315 residential units (Buildings 4, 5, and 6), an approximately 100,000 SF office tower, a 175 room hotel, and a 4,812 SF restaurant. The development is expected to be completed by 2026.

**Trip Generation
Estimates for the
Proposed
Development**

Site generated trips have been estimated (Table 2) using rates published in *Trip Generation, 9th Edition* (Institute of Transportation Engineers, 2012). It is estimated that the proposed development will generate 347 two-way vehicle trips (217 entering and 130 exiting) during the AM peak hour and 375 two-way vehicle trips (158 entering and 217 exiting) during the PM peak hour after a 10% trip reduction for on-site synergies within the Harbour Isle development and non-vehicle (transit) trips.

Table 2 - Trip Generation Estimates for Proposed Mixed Use Development									
Land Use ¹	Units ²	Trip Generation Rates ³				Trips Generated ³			
		AM Peak		PM Peak		AM Peak		PM Peak	
		In	Out	In	Out	In	Out	In	Out
High Rise Apt (Land Use 222)	315 Apts	0.075	0.225	0.21	0.14	24	71	67	43
Hotel (Land Use 310)	175 Rooms	0.39	0.28	0.34	0.36	68	49	60	62
General Office (Land Use 710)	100.0 KGFA	1.37	0.19	0.25	1.24	137	19	25	124
Quality Restaurant ⁴ (Land Use 931)	4.812 KGFA	2.51	1.24	5.02	2.47	12	6	24	12
Trip Generation Estimate for Proposed Mixed Use Development						241	145	176	241
Less 10% for On-Site Synergies within Harbour Isle Development						24	15	18	24
Estimated External Trips Generated by Proposed Development						217	130	158	217
NOTES: 1. Land Use Codes are from <i>Trip Generation, 9th Edition</i> , Institute of Transportation Engineers, Washington, 2012. 2. KGFA is 'Gross Floor Area x 1000 square feet'. 3. Trip generation rates are 'vehicles per hour per unit'; trips generated are 'vehicles per hour' for AM and PM peak hours. 4. While a Quality Restaurant (Land Use 931) is not usually open during the AM peak hour, 50% of the published PM peak hour rate has been used to estimate AM peak hour trips for this location.									

**Projected 2026
Volumes with Site
Generated Trips
without Highway 107**

Site generated trips have been distributed using the same percentages used for distribution of the approved and as-of-right developments. Assigned site generated trips, shown diagrammatically in Figure A-2, Boxes C and D, have been added to projected 2026 background volumes without Highway 107 (Figure A-2, Boxes A and B) to provide projected 2026 volumes with added site generated trips (shown diagrammatically in Figure A-3, Boxes A and B).

**Projected 2026
Volumes with Site
Generated Trips with
Highway 107**

Estimated trips diverted to Highway 107 (Figure A-3, Boxes C and D) have been subtracted from the projected 2026 volumes with site generated trips but without Highway 107 (Figure A-3, Boxes A and B) to provide estimated 2026 AM and PM peak hourly volumes that include consideration of traffic diversion to Highway 107 (illustrated diagrammatically in Figure A-4, Boxes C and D).

4.0 Intersection Performance Analysis

Intersection Level of Service Analysis

The level or quality of performance of an intersection in terms of traffic movement is determined by a level of service (LOS) analysis. LOS for intersections is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and increased travel time. LOS criteria (Table 3) are stated in terms of average control delay per vehicle which includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Table 3 - Level of Service (LOS) Criteria for Intersections		
LOS	Signalized Intersections Control Delay (seconds per vehicle)	LOS Description
A	less than 10.0	Very low delay; most vehicles do not stop (Excellent)
B	between 10.0 and 20.0	Higher delay; more vehicles stop (Very Good)
C	between 20.0 and 35.0	Higher level of congestion; number of vehicles stopping is significant, although many still pass through intersection without stopping (Good)
D	between 35.0 and 55.0	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; many vehicles stop (Satisfactory)
E	between 55.0 and 80.0	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of acceptable delay
F	greater than 80.0	This level is considered to be unacceptable to most drivers; occurs when arrival flow rates exceed the capacity of the intersection (Unacceptable)

Intersection Level of Service Analysis

Synchro 9.0 software has been used for performance evaluation of AM and PM peak hours at two Study Area intersections for the following scenarios:

- Projected 2016 volumes without any development;
- Projected 2026 background volumes with trips generated by approved and as-of-right developments;
- Projected 2026 volumes with trips generated by build-out of the proposed development;
- Projected 2026 background volumes with trips generated by approved and as-of-right developments, and consideration of trip diversions to Highway 107; and
- Projected 2026 volumes with trips generated by build-out of the proposed development, and consideration of trip diversions to Highway 107.

Analyses at both intersections have been completed using the existing 140 second signal cycle, with addition of a northbound left turn phase on Windmill Road at Seapoint Road and minor timing modifications to facilitate improved intersection performance.

LOS analysis sheets are included in Appendix B and results are summarized in the following tables:

- Table 4 - Windmill Road @ Seapoint Road / Ralston Avenue
- Table 5 - Windmill Road @ Bancroft Lane / Wright Avenue.

Table 4 - LOS for Windmill Road @ Seapoint Road / Ralston Avenue Intersection											
LOS Criteria	Control Delay (sec/veh), v/c Ratio, and 95 th % Queue (m) by Intersection Movement									Intersection LOS	
	EB-LT	EB-R	WB-L	WB-TR	NB-L	NB-T	NB-R	SB-L	SB-T		SB-R
AM Peak Hour - Projected 2016 Background Volumes - No Development (Page B-1)											
Delay	73.0	52.6	59.8	9.6	2.2	0.0	3.2	5.5	1.3	6.0	
v/c	0.39	0.52	0.05	0.29	0.41	0.01	0.10	0.66	0.04		
Queue	21.5	26.9	5.7	2.6	42.9	0.0	4.1	131.0	3.5		
AM Peak Hour - Projected 2026 Background Volumes with Approved and As of Right Developments (Page B-5)											
Delay	77.8	16.3	28.7	21.3	13.1	2.8	7.2	14.4	2.0	15.0	
v/c	0.55	0.48	0.19	0.29	0.45	0.01	0.11	0.78	0.06		
Queue	31.8	17.8	11.4	9.9	115.5	0.2	6.8	242.2	5.5		
AM Peak Hour - Projected 2026 Volumes with Build-out of Proposed Development without Highway 107 (Page B-9)											
Delay	79.5	31.0	31.2	29.1	17.6	3.2	10.0	20.8	5.0	21.3	
v/c	0.68	0.64	0.19	0.49	0.47	0.01	0.12	0.84	0.13		
Queue	46.4	41.0	15.0	16.6	88.3	0.1	8.7	308.7	17.1		
AM Peak Hour - Projected 2026 Background Volumes with Approved and As of Right Developments and Consideration of Traffic Diversion to Highway 107 (Page B-13)											
Delay	77.8	16.3	28.7	8.9	7.5	2.1	6.9	10.2	2.0	10.6	
v/c	0.55	0.48	0.19	0.19	0.42	0.01	0.10	0.62	0.06		
Queue	31.8	17.8	11.4	5.5	97.5	0.3	6.7	147.9	5.5		
AM Peak Hour - Projected 2026 Volumes with Build-out of Proposed Development and Consideration of Traffic Diversion to Highway 107 (Page B-17)											
Delay	79.5	26.6	31.2	20.4	11.0	2.9	9.3	14.2	4.8	15.6	
v/c	0.68	0.62	0.19	0.34	0.43	0.01	0.11	0.67	0.13		
Queue	46.4	37.2	15.0	17.3	118.1	0.3	8.3	184.9	16.7		
PM Peak Hour - Projected 2016 Background Volumes - No Development (Page B-3)											
Delay	56.2	14.5	45.1	75.0	5.0	11.7	0.0	13.6	10.5	0.2	16.5
v/c	0.32	0.08	0.08	0.86	0.15	0.78	0.00	0.15	0.52	0.01	
Queue	18.4	7.8	12.5	100.5	1.5	293.5	0.0	4.4	106.1	0.3	
PM Peak Hour - Projected 2026 Background Volumes with Approved and As of Right Developments (Page B-7)											
Delay	97.4	11.1	45.3	80.1	5.9	11.6	0.0	18.5	11.1	3.4	18.0
v/c	0.77	0.18	0.08	0.90	0.28	0.82	0.00	0.20	0.55	0.04	
Queue	44.9	12.3	12.6	119.4	3.0	60.3	0.0	5.1	110.6	5.2	
PM Peak Hour - Projected 2026 Volumes with Build-out of Proposed Development without Highway 107 (Page B-11)											
Delay	193.9	26.0	45.4	68.7	8.3	13.3	0.0	18.4	12.2	4.0	23.2
v/c	1.21	0.37	0.09	0.82	0.51	0.84	0.00	0.20	0.56	0.09	
Queue	92.4	37.5	12.7	120.6	5.1	58.1	0.0	5.0	110.6	9.8	
PM Peak Hour - Projected 2026 Background Volumes with Approved and As of Right Developments and Consideration of Traffic Diversion to Highway 107 (Page B-15)											
Delay	99.6	11.6	47.9	68.7	4.6	5.9	0.0	8.2	8.3	3.1	13.5
v/c	0.77	0.21	0.10	0.82	0.20	0.65	0.00	0.08	0.45	0.04	
Queue	38.9	12.3	12.6	81.1	3.9	53.6	0.0	3.4	87.9	5.2	
PM Peak Hour - Projected 2026 Volumes with Build-out of Proposed Development and Consideration of Traffic Diversion to Highway 107 (Page B-19)											
Delay	82.4	15.3	42.4	47.6	6.4	7.5	0.0	11.6	12.2	4.2	15.1
v/c	0.81	0.33	0.08	0.62	0.40	0.71	0.00	0.11	0.49	0.09	
Queue	78.3	27.8	12.7	81.8	2.8	62.6	0.0	3.6	87.9	9.1	

Table 5 - LOS for Windmill Road @ Bancroft Lane / Wright Avenue Intersection												
LOS Criteria	Control Delay (sec/veh), v/c Ratio, and 95 th % Queue (m) by Intersection Movement											Intersection LOS
	EB-L	EB-TR	WB-L	WB-LT	WB-R	NB-L	NB-T	NB-R	SB-L	SB-T	SB-R	
AM Peak Hour - Projected 2016 Background Volumes - No Development (Page B-2)												
Delay	73.2	75.0	71.8	71.0	11.4	34.0	42.9	15.2	44.9	37.5	4.6	40.2
v/c	0.46	0.78	0.68	0.67	0.49	0.48	0.76	0.41	0.87	0.82	0.09	
Queue	31.3	53.4	63.7	63.6	19.9	24.1	229.3	55.6	117.7	279.3	7.5	
AM Peak Hour - Projected 2026 Background Volumes with Approved and As of Right Developments (Page B-6)												
Delay	64.5	70.7	71.7	70.7	11.0	42.2	75.6	19.8	51.3	49.7	7.0	54.0
v/c	0.36	0.78	0.69	0.68	0.49	0.58	1.01	0.50	0.84	0.94	0.10	
Queue	30.3	59.6	67.5	66.7	20.0	32.2	262.9	63.5	157.9	335.2	4.9	
AM Peak Hour - Projected 2026 Volumes with Build-out of Proposed Development without Highway 107 (Page B-10)												
Delay	63.6	76.3	69.9	69.9	10.3	56.3	146.7	22.3	46.5	90.8	9.3	85.9
v/c	0.34	0.84	0.69	0.70	0.52	0.77	1.21	0.57	0.81	1.08	0.11	
Queue	30.3	72.0	70.6	72.1	21.2	61.2	262.9	63.5	163.3	391.8	4.9	
AM Peak Hour - Projected 2026 Background Volumes with Approved and As of Right Developments and Consideration of Traffic Diversion to Highway 107 (Page B-14)												
Delay	64.5	70.7	72.5	71.4	8.3	27.2	43.3	15.0	49.9	39.4	7.3	41.6
v/c	0.36	0.78	0.70	0.69	0.39	0.49	0.77	0.43	0.80	0.75	0.10	
Queue	30.3	59.6	67.5	66.7	13.6	26.7	225.4	57.2	117.4	206.3	9.8	
AM Peak Hour - Projected 2026 Volumes with Build-out of Proposed Development and Consideration of Traffic Diversion to Highway 107 (Page B-18)												
Delay	63.6	76.3	71.2	71.2	10.5	61.9	50.4	16.9	55.3	51.0	10.4	49.7
v/c	0.34	0.84	0.70	0.71	0.44	0.82	0.85	0.46	0.86	0.86	0.11	
Queue	30.3	72.0	71.2	72.6	18.8	65.5	245.1	60.5	132.6	288.0	10.7	
PM Peak Hour - Projected 2016 Background Volumes - No Development (Page B-4)												
Delay	69.3	35.2	46.0	45.8	50.6	18.5	58.9	6.4	55.2	39.4	0.3	47.5
v/c	0.27	0.44	0.45	0.45	0.95	0.13	0.97	0.24	0.82	0.67	0.03	
Queue	17.0	18.4	78.4	77.8	180.4	8.4	266.6	17.9	74.2	195.5	0.0	
PM Peak Hour - Projected 2026 Background Volumes with Approved and As of Right Developments (Page B-8)												
Delay	69.9	35.4	47.4	47.1	70.7	22.4	101.1	6.8	65.7	42.2	0.1	65.8
v/c	0.27	0.60	0.49	0.48	1.01	0.34	1.11	0.26	0.92	0.77	0.03	
Queue	17.1	24.8	86.0	85.4	207.2	15.0	286.9	18.9	94.5	203.1	0.0	
PM Peak Hour - Projected 2026 Volumes with Build-out of Proposed Development without Highway 107 (Page B-12)												
Delay	66.7	59.3	50.2	49.9	86.2	36.4	114.1	6.9	112.9	42.7	0.1	75.7
v/c	0.22	0.85	0.55	0.54	1.06	0.61	1.14	0.26	1.10	0.82	0.04	
Queue	17.1	59.6	92.4	92.3	215.9	26.5	295.4	18.9	131.4	200.8	0.0	
PM Peak Hour - Projected 2026 Background Volumes with Approved and As of Right Developments and Consideration of Traffic Diversion to Highway 107 (Page B-16)												
Delay	69.1	35.4	57.3	56.7	42.8	17.2	39.9	6.5	45.1	35.2	0.5	39.2
v/c	0.27	0.60	0.64	0.63	0.90	0.22	0.79	0.22	0.74	0.59	0.03	
Queue	17.1	24.8	86.0	85.4	110.9	15.0	220.7	18.9	59.0	173.2	0.7	
PM Peak Hour - Projected 2026 Volumes with Build-out of Proposed Development and Consideration of Traffic Diversion to Highway 107 (Page B-20)												
Delay	65.9	59.3	62.8	61.9	9.1	20.4	44.6	7.4	81.3	34.2	0.2	40.0
v/c	0.22	0.85	0.71	0.70	0.70	0.39	0.85	0.23	0.91	0.63	0.03	
Queue	17.1	59.6	92.4	92.3	30.1	23.0	265.8	21.1	87.0	157.9	0.1	

**HRM Critical Limits
for Intersection
Performance
Evaluation.**

The HRM *Guidelines for Preparation of Transportation Impact Studies* indicates the following critical limits for intersection evaluation:

1. the v/c ratio of an intersection exceeds 0.85;
2. the v/c ratio of an individual through movement or shared through/ turning movement exceeds 0.85;
3. the v/c ratio of an exclusive turning movement exceeds 1.0;
4. an exclusive turning movement generates queues which exceed the available turning lane storage space.

**Summary Level of
Service Analysis for
Projected 2026
Volumes that
Include Harbour Isle
Build-out**

Level of service (LOS) analyses indicate (Table 4) the following for the **Windmill Road @ Seapoint Road / Ralston Avenue** intersection:

- The intersection is expected to provide good overall performance for projected 2026 volumes, both without and with traffic diversion to Highway 107.
- While all approaches are expected to operate within HRM criteria during both AM and PM peak hours with traffic diversion to Highway 107, the EB-LT is expected to have a v/c ratio of 1.21 during the PM peak hour without Highway 107.

Level of service (LOS) analyses indicate (Table 5) the following for the **Windmill Road @ Bancroft Lane / Wright Avenue** intersection:

- The intersection is expected to operate with average delays of 86 seconds per vehicle during AM peak hour and 76 seconds during the PM peak hour, without traffic diversion to Highway 107.
- Two approaches are expected to have high v/c ratios during AM peak hours without Highway 107, including NB-T (v/c 1.21) and SB-T (v/c 1.08).
- Three approaches are expected to have high v/c ratios during PM peak hours without Highway 107, including WB-R (v/c 1.06), NB-T (v/c 1.14), and SB-L (v/c 1.10).
- With traffic diversion to Highway 107, the intersection is expected to provide improved overall performance for projected 2026 volumes with average delays of 45 seconds per vehicle during AM peak hour and 40 seconds during the PM peak hour.
- With traffic diversion to Highway 107, all approaches are expected to operate within HRM criteria during both AM and PM peak hours, except for SB-T with a v/c ratio of 0.86 during the AM peak hour.

5.0 Summary and Conclusions

***Description of the
Approved and As-of-
right Development***

1. The site now has approval for construction of an additional 210 apartment units. Also, construction of 59,551 SF of commercial space, in addition to the existing 4,173 SF Starbucks, is considered to be allowed as-of-right on Marketplace Drive.

***Description of the
Proposed
Development***

2. The proposed development includes 315 residential units, an approximately 100,000 SF office tower, a 175 room hotel, and a 4,812 SF restaurant. The development is expected to be completed by 2026.

***Proposed Site
Accesses***

3. The proposed development will access Windmill Road at Seapoint Road opposite Ralston Avenue intersection, and by extending Marketplace south to Bancroft Lane which intersects with Windmill Road opposite the Wright Avenue intersection.

***Projected 2026
Traffic Volumes***

4. Turning movement counts obtained during December 2015 at two study area intersections on Windmill Road were used with a 0.5% annual growth rate to project 2026 AM and PM peak hour volumes without any additional Harbour Isle development.

***Estimated 2026
Background
Volumes without
Traffic Diversion to
Highway 107***

5. Trips generated by the approved 210 apartment units and 59,551 SF of commercial space were assigned to study area intersections and added to projected 2026 volumes to provide estimated 2026 background volumes for the study without consideration of traffic diversion to Highway 107.

***Estimated 2026
Background
Volumes with
Traffic Diversion to
Highway 107***

6. *Traffic Study for Highway 107 Phase 1 - Burnside to Sackville* (WSP Canada Inc., 2011) has been reviewed to determine the impact of the highway extension, expected to be completed by 2026, in reducing peak hour traffic volumes in the study area. Estimated trips diverted from Windmill Road study area intersections to Highway 107 have been subtracted from the projected 2026 background volumes without Highway 107 to provide estimated 2026 AM and PM peak hourly background volumes for this Study that include consideration of traffic diversion to Highway 107.

***Transit Service to
Serve in the Study
Area***

7. Windmill Road adjacent to the site is served by Halifax Transit routes 51, 64, 85, 87, and 185, which also provide connections to other routes at Transit and Ferry Terminals.

***Trip Generation
Estimates for the
Proposed
Development***

8. It is estimated that the proposed development will generate 347 two-way vehicle trips (217 entering and 130 exiting) during the AM peak hour and 375 two-way vehicle trips (158 entering and 217 exiting) during the PM peak hour after a 10% trip reduction for on-site synergies within the Harbour Isle development and non-vehicle (transit) trips.

***Trip Distribution of
Site Generated Trips***

9. The following trip distribution has been used in this study:
- North - 30%
 - East - 30%
 - South - 40%.

***Summary Level of
Service Analyses for
Projected 2026
Volumes that Include
Full Build-Out of
Harbour Isle***

10. Level of service (LOS) analyses indicate (Table 4) the following for the ***Windmill Road @ Seapoint Road / Ralston Avenue*** intersection:
- The intersection is expected to provide good overall performance for projected 2026 volumes, both without and with traffic diversion to Highway 107.
 - While all approaches are expected to operate within HRM criteria during both AM and PM peak hours with traffic diversion to Highway 107, the EB-LT is expected to have a v/c ratio of 1.21 during the PM peak hour without Highway 107.

Level of service (LOS) analyses indicate (Table 5) the following for the ***Windmill Road @ Bancroft Lane / Wright Avenue*** intersection:

- The intersection is expected to operate with average delays of 86 seconds per vehicle during AM peak hour and 76 seconds during the PM peak hour, without traffic diversion to Highway 107.
- Two approaches are expected to have high v/c ratios during AM peak hours without Highway 107, including NB-T (v/c 1.21) and SB-T (v/c 1.08).
- Three approaches are expected to have high v/c ratios during PM peak hours without Highway 107, including WB-R (v/c 1.06), NB-T (v/c 1.14), and SB-L (v/c 1.10).
- With traffic diversion to Highway 107, the intersection is expected to provide improved overall performance for projected 2026 volumes with average delays of 45 seconds per vehicle during AM peak hour and 40 seconds during the PM peak hour.
- With traffic diversion to Highway 107, all approaches are expected to operate within HRM criteria during both AM and PM peak hours, except for SB-T with a v/c ratio of 0.86 during the AM peak hour.

Conclusions

11. A. While the Seapoint Road / Ralston Avenue intersection is expected to provide good overall performance, the high projected 2026 volumes at the Bancroft Lane / Wright Avenue will continue to result in high delays and v/c ratios for Windmill Road approaches until Highway 107 is constructed.
- B. Traffic diversion to the planned section of Highway 107 from Burnside Drive to Bedford and Highway 102, which is expected to be constructed before the proposed project is completed, will reduce Windmill Road volumes which will improve traffic operations at both Windmill Road intersections.

Appendix A

Turning Movement Counts

Traffic Volume Diagrams

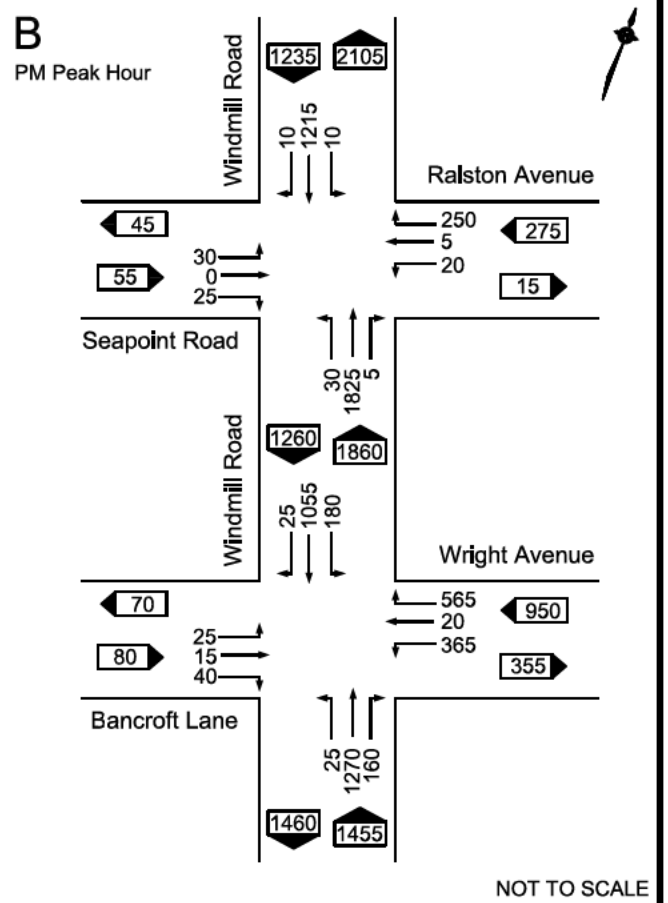
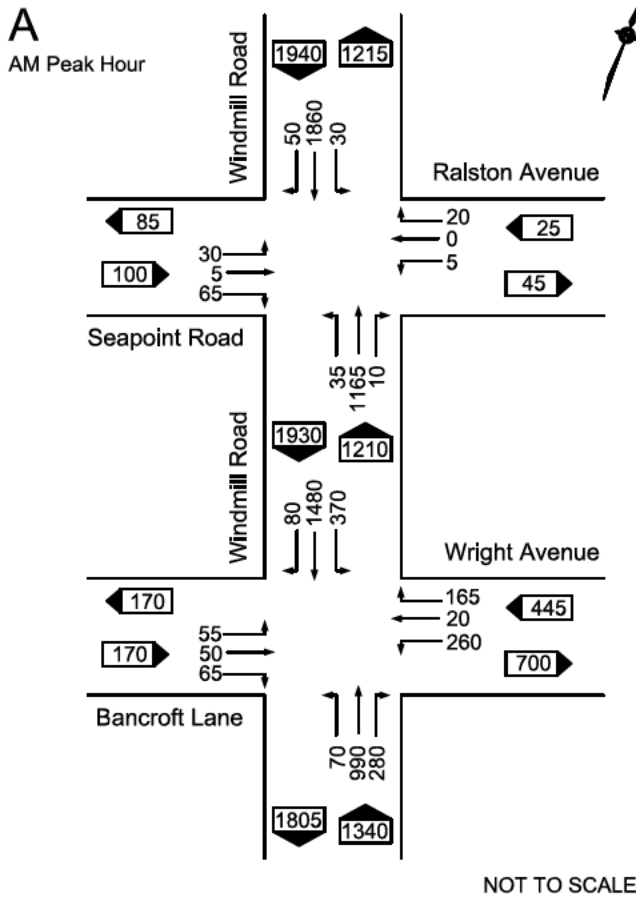
<div>Table A-1</div> <div>Windmill Road @ Seapoint Road / Ralston Avenue</div> <div>Dartmouth, NS</div> <div>Wednesday, December 16, Thursday December 17, 2015</div>							<div><div><div>Windmill Road</div><div>I H G</div><div><div><div></div><div></div><div></div></div></div></div><div><div>J</div><div>K</div><div>L</div></div><div>Seapoint Road</div></div> <div><div><div>Ralston Avenue</div><div>F</div><div>E</div><div>D</div></div></div> <div><div><div></div><div></div><div></div></div><div>A B C</div></div>							
AM Peak Period Volume Data														
Time		Windmill Road Northbound Approach			Ralston Avenue Westbound Approach			Windmill Road Southbound Approach			Seapoint Road Eastbound Approach			Total Vehicles
		A	B	C	D	E	F	G	H	I	J	K	L	
07 00	07 15	2	209	8	1	0	1	4	509	11	4	0	10	757
07 15	07 30	3	263	8	0	0	1	11	501	12	4	1	8	812
07 30	07 45	6	268	2	3	0	3	3	474	9	3	1	18	790
07 45	08 00	11	323	2	1	0	6	6	451	14	13	0	16	843
08 00	08 15	10	312	1	0	0	7	4	474	10	6	0	16	840
08 15	08 30	8	279	4	1	0	5	15	458	16	8	3	15	812
08 30	08 45	12	230	2	2	1	12	4	394	10	11	1	13	662
08 45	09 00	10	252	3	1	0	8	7	376	11	7	0	15	660
AM Peak Hour		35	1182	9	5	0	21	28	1857	49	30	4	65	3285
07:00 - 08:00		22	1063	18	5	0	11	24	1935	46	24	2	52	3202
08:00 - 09:00		40	1073	10	4	1	32	30	1702	47	32	4	59	3034
PM Peak Period Volume Data														
Time		Windmill Road Northbound Approach			Ralston Avenue Westbound Approach			Windmill Road Southbound Approach			Seapoint Road Eastbound Approach			Total Vehicles
		A	B	C	D	E	F	G	H	I	J	K	L	
15 30	15 45	15	463	2	5	0	34	1	260	4	3	0	8	795
15 45	16 00	11	478	3	0	0	27	1	262	5	5	0	11	833
16 00	16 15	5	482	2	3	0	49	3	284	3	5	0	17	853
16 15	16 30	10	466	3	9	2	54	1	305	0	5	0	4	859
16 30	16 45	5	419	0	5	1	75	3	325	6	9	0	3	851
16 45	17 00	10	437	2	1	2	73	2	294	2	9	0	2	834
17 00	17 15	8	404	3	3	3	70	1	304	3	4	0	7	810
17 15	17 30	9	429	0	2	1	66	4	312	8	3	0	10	844
PM Peak Hour		30	1804	7	18	5	251	9	1208	11	28	0	26	3397
15:30 - 16:30		41	1889	10	17	2	164	6	1141	12	18	0	40	3340
16:30 - 17:30		32	1689	5	11	7	284	10	1235	19	25	0	22	3339

* Count completed by WSP

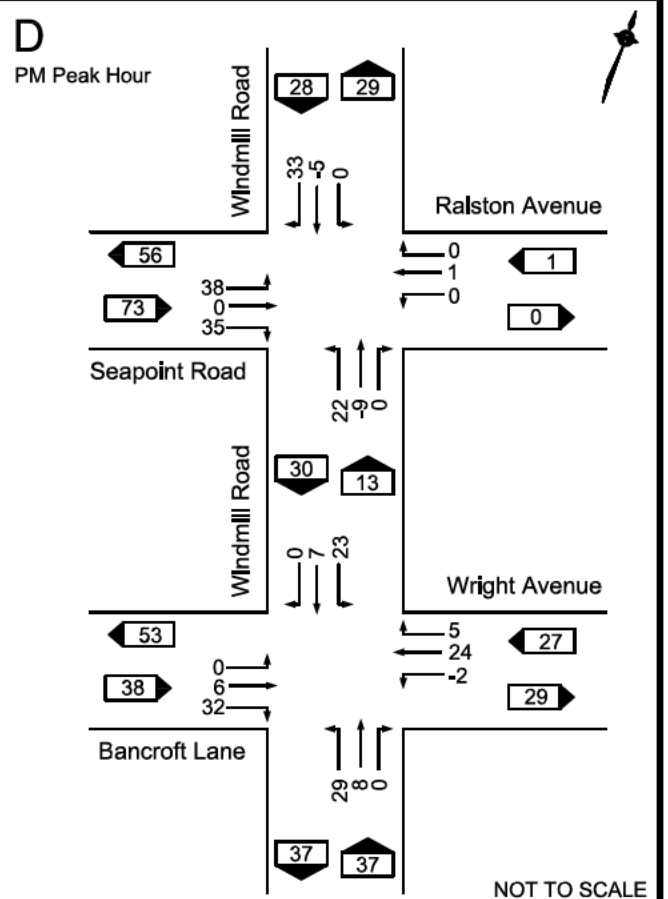
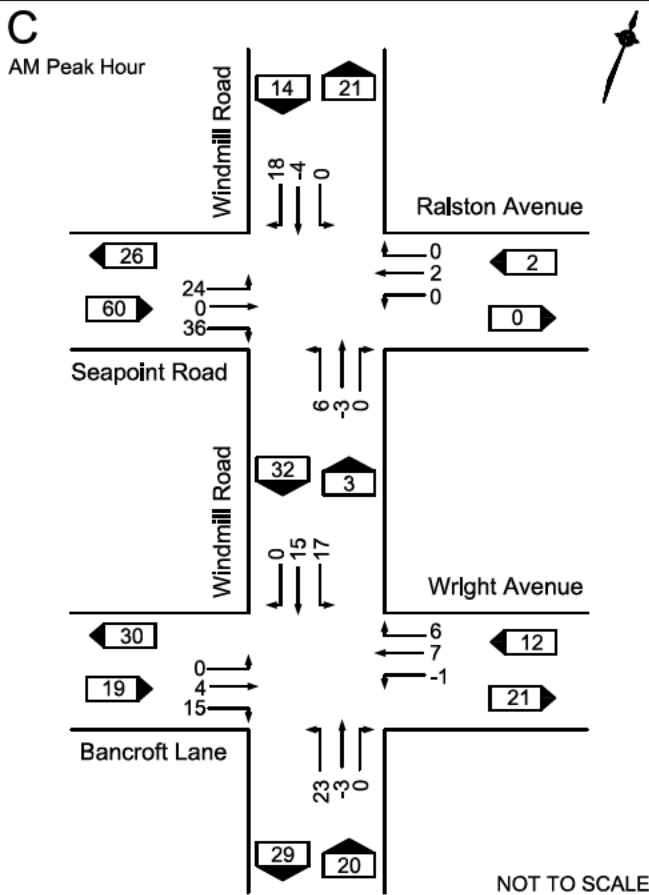
<div>Table A-2</div> <div>Windmill Road @ Wright Avenue / Bancroft Lane</div> <div>Dartmouth, NS</div> <div>Wednesday, December 16, Thursday December 17, 2015</div>				<div><div><div>Windmill Road</div><div>I H G</div><div><div><div></div><div></div><div></div></div></div><div><div>J</div><div>K</div><div>L</div></div><div>Bancroft Lane</div></div><div><div><div>Wright Avenue</div><div>F</div><div>E</div><div>D</div></div><div><div>A</div><div>B</div><div>C</div></div></div></div>											
AM Peak Period Volume Data															
Time	Windmill Road Northbound Approach			Wright Avenue Westbound Approach			Windmill Road Southbound Approach			Bancroft Lane Eastbound Approach			Total Vehicles		
	A	B	C	D	E	F	G	H	I	J	K	L			
07 00 07 15	13	194	64	31	8	25	81	424	26	9	10	15	900		
07 15 07 30	19	201	68	53	5	30	97	360	22	8	13	25	901		
07 30 07 45	21	231	58	46	4	26	93	366	17	12	19	15	908		
07 45 08 00	18	239	90	68	2	53	100	365	22	15	16	15	1003		
08 00 08 15	17	243	74	66	9	50	91	372	21	14	7	18	985		
08 15 08 30	12	243	58	77	6	34	84	360	18	13	10	18	933		
08 30 08 45	13	203	58	66	11	26	62	328	21	7	14	22	831		
08 45 09 00	8	200	57	45	8	43	82	290	17	6	6	24	786		
AM Peak Hour	68	956	280	260	21	163	368	1463	78	54	52	66	3829		
07:00 08:00	71	865	280	198	19	134	371	1515	87	44	58	70	3712		
08:00 09:00	50	889	247	257	34	153	319	1350	77	40	37	82	3535		
PM Peak Period Volume Data															
Time	Windmill Road Northbound Approach			Wright Avenue Westbound Approach			Windmill Road Southbound Approach			Bancroft Lane Eastbound Approach			Total Vehicles		
	A	B	C	D	E	F	G	H	I	J	K	L			
15 30 15 45	7	320	42	78	8	115	40	224	14	7	5	10	870		
15 45 16 00	10	381	33	56	15	109	49	250	6	5	4	13	931		
16 00 16 15	8	343	51	113	3	131	45	254	4	6	5	12	975		
16 15 16 30	4	333	32	94	0	137	47	264	5	3	3	4	926		
16 30 16 45	1	212	41	99	3	184	37	281	11	9	2	10	890		
16 45 17 00	5	265	34	75	3	180	42	253	5	1	2	10	875		
17 00 17 15	2	208	25	117	0	184	51	255	4	11	1	5	863		
17 15 17 30	2	199	23	47	2	184	38	258	7	0	3	9	772		
PM Peak Hour	23	1269	157	362	21	561	178	1049	26	23	14	39	3722		
15:30 16:30	29	1377	158	341	26	492	181	992	29	21	17	39	3702		
16:30 17:30	10	884	123	338	8	732	168	1047	27	21	8	34	3400		

* Count completed by WSP

2016 AM and PM Peak Hour
Background Volumes Without Site Development



Estimated Trips Generated By
'As of Right' and Approved Development Areas



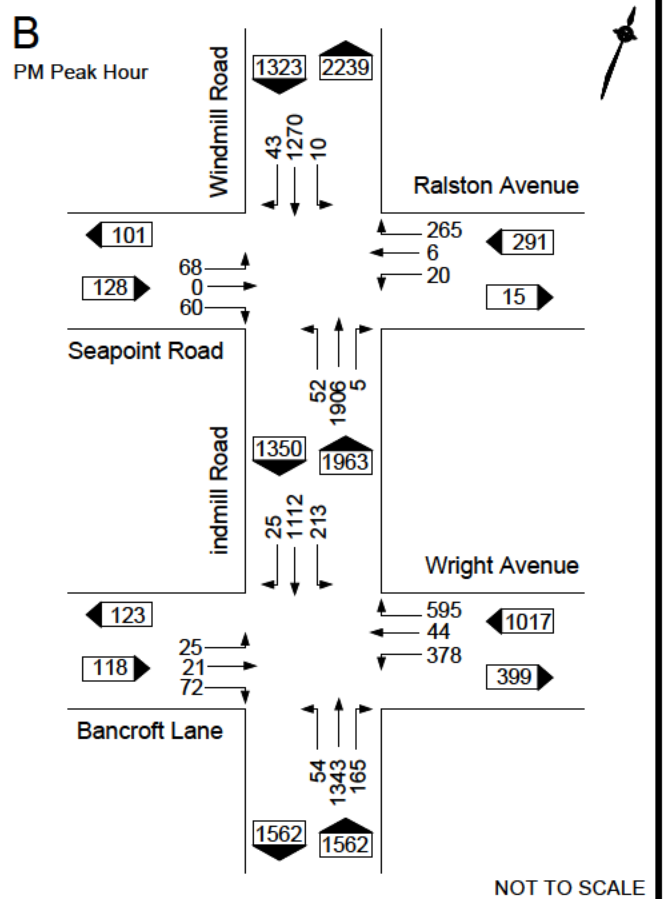
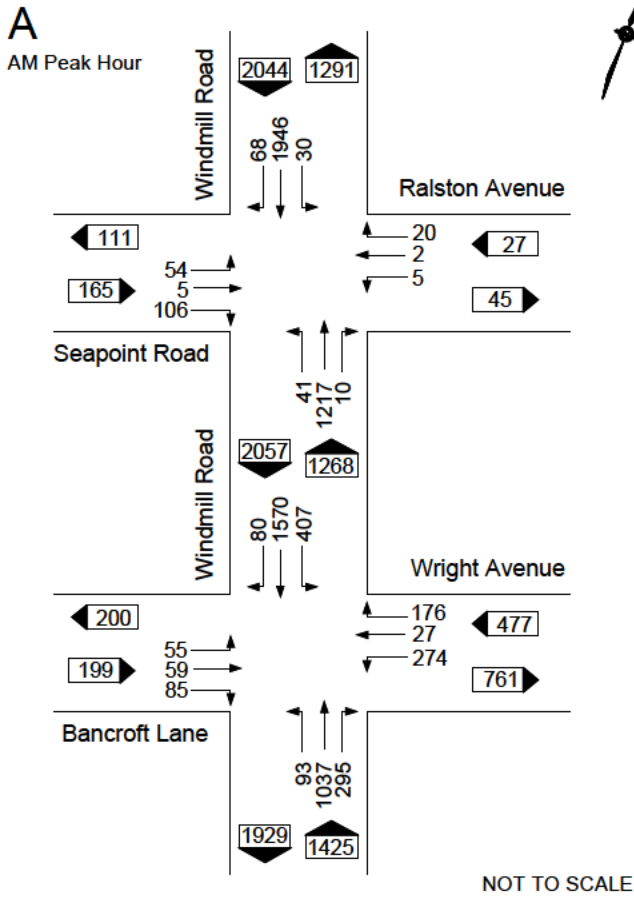
Traffic Impact Study - Proposed Multi-use Development
Harbour Isle, Dartmouth, NS

Figure A-1

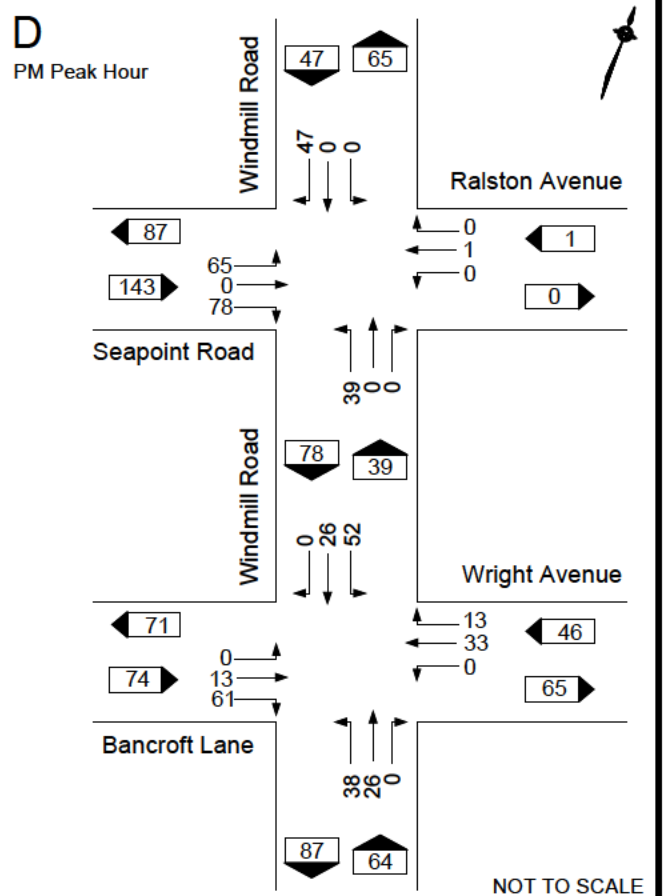
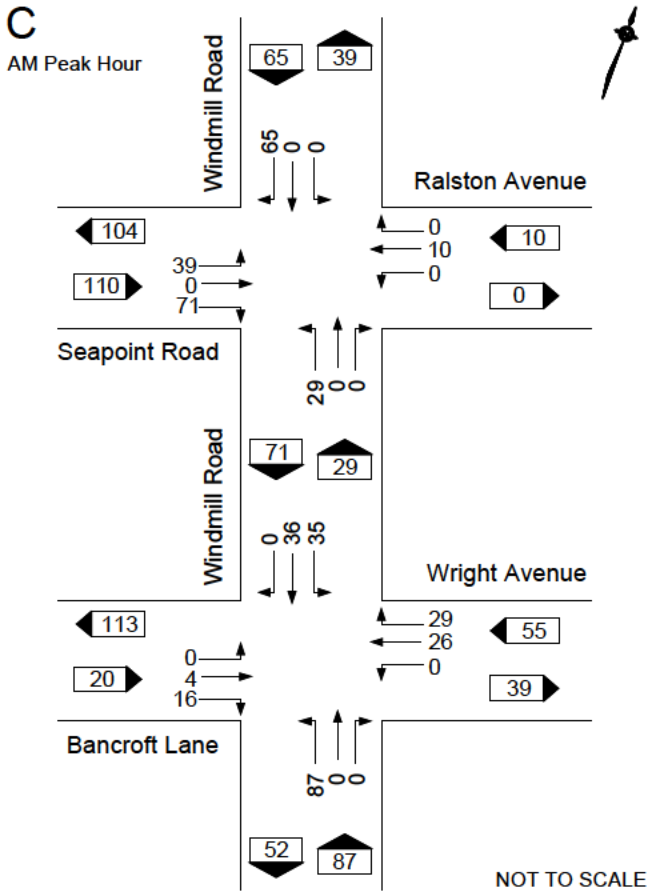
Projected 2016 Weekday AM and PM Peak Hour
Background Traffic and Approved Development Trips

March 2016

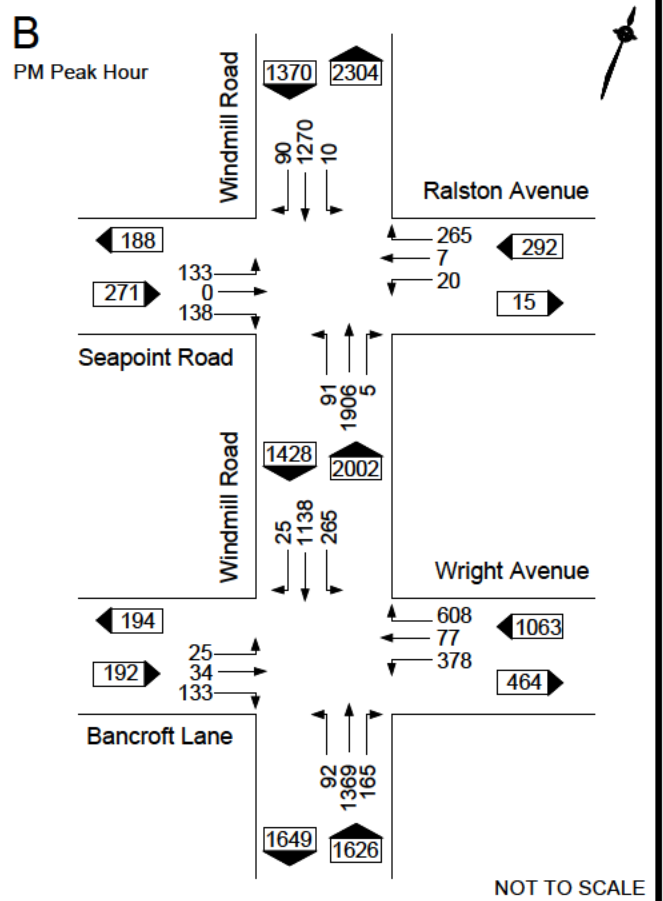
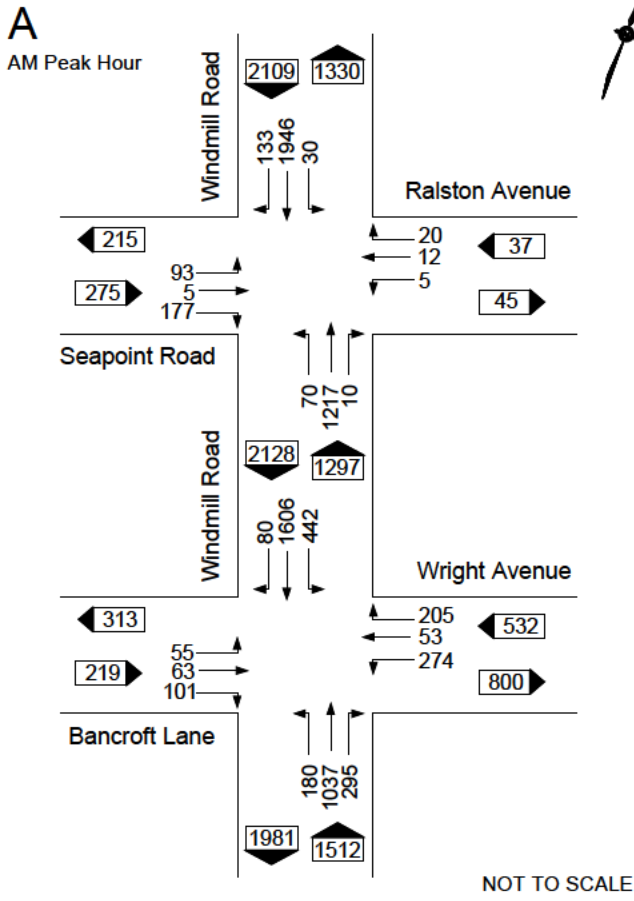
2026 AM and PM Peak Hour Background Volumes



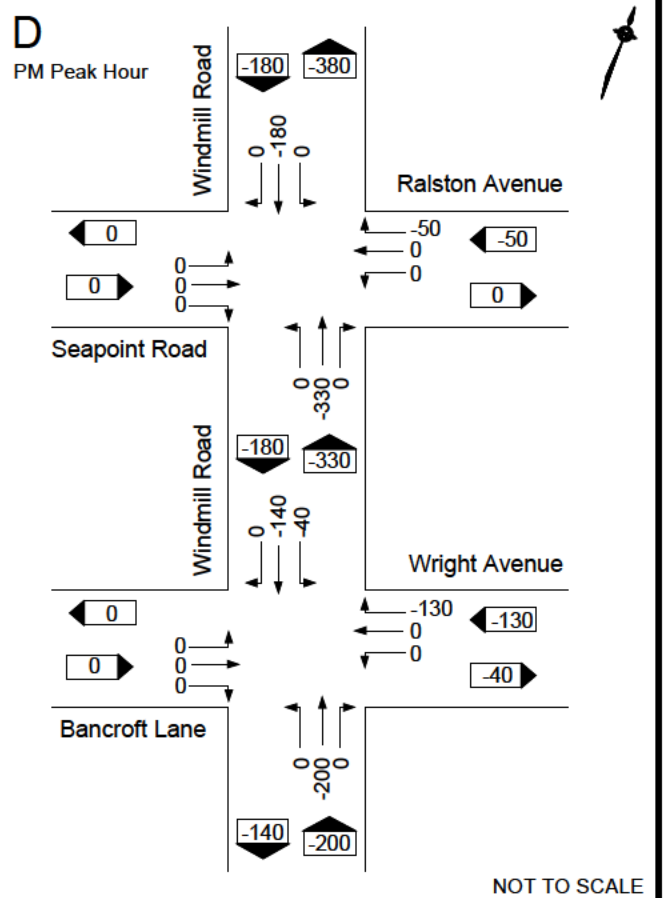
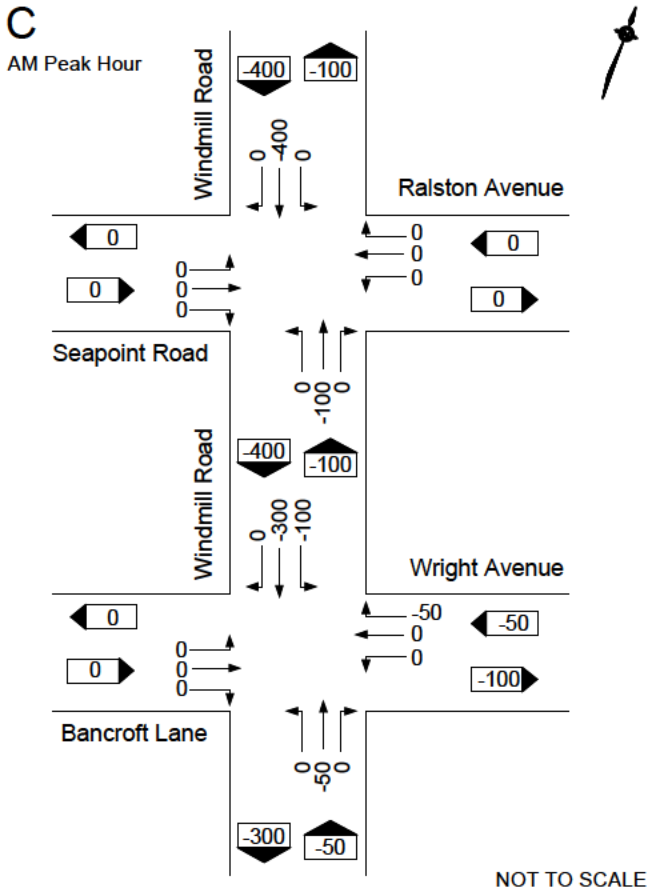
Estimated Site Generated Trips



2026 AM and PM Peak Hour Volumes with Site Generated Trips



Estimated Diverted Volumes with Highway 107 Connection



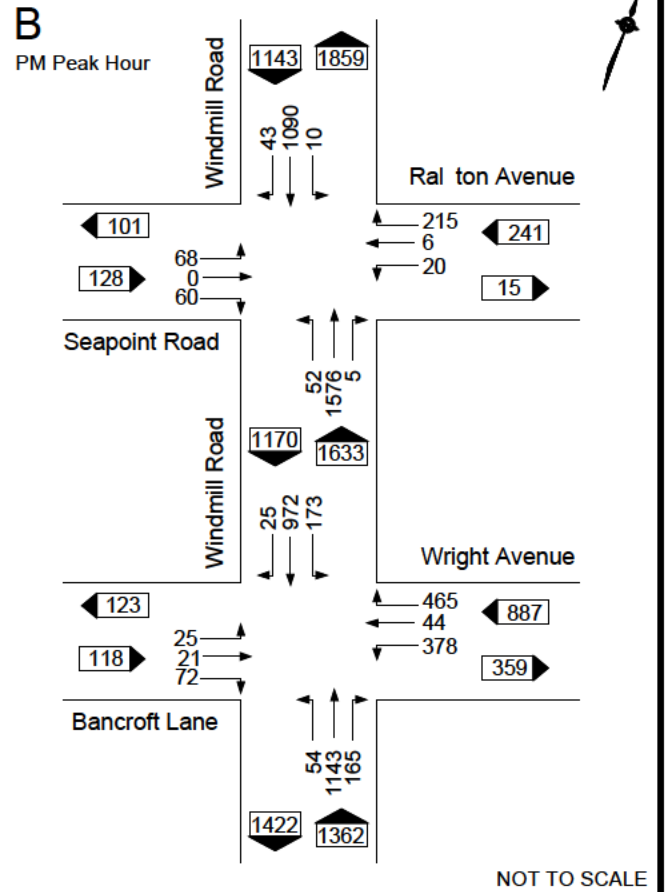
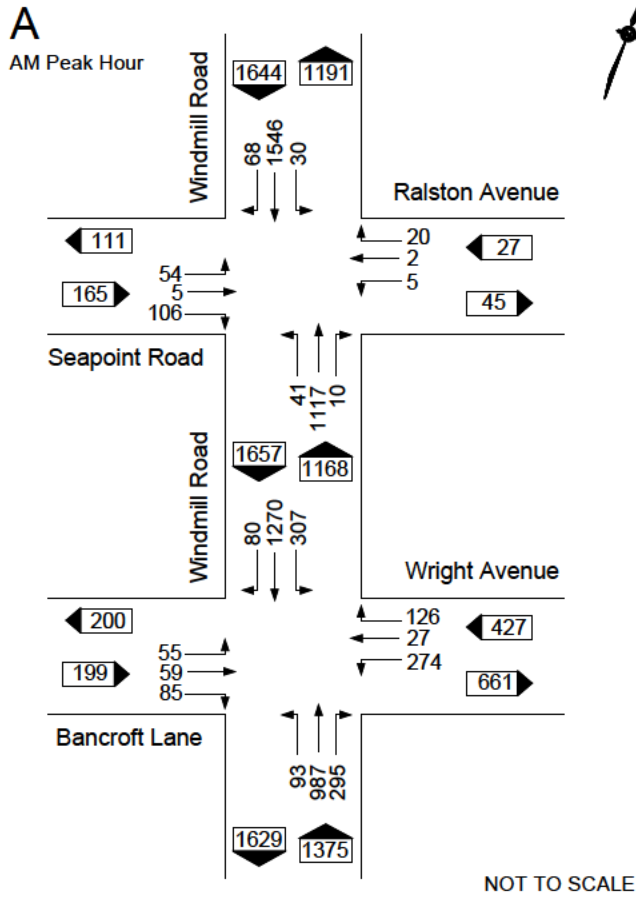
Traffic Impact Study - Proposed Multi-use Development
Harbour Isle, Dartmouth, NS

Figure A-3

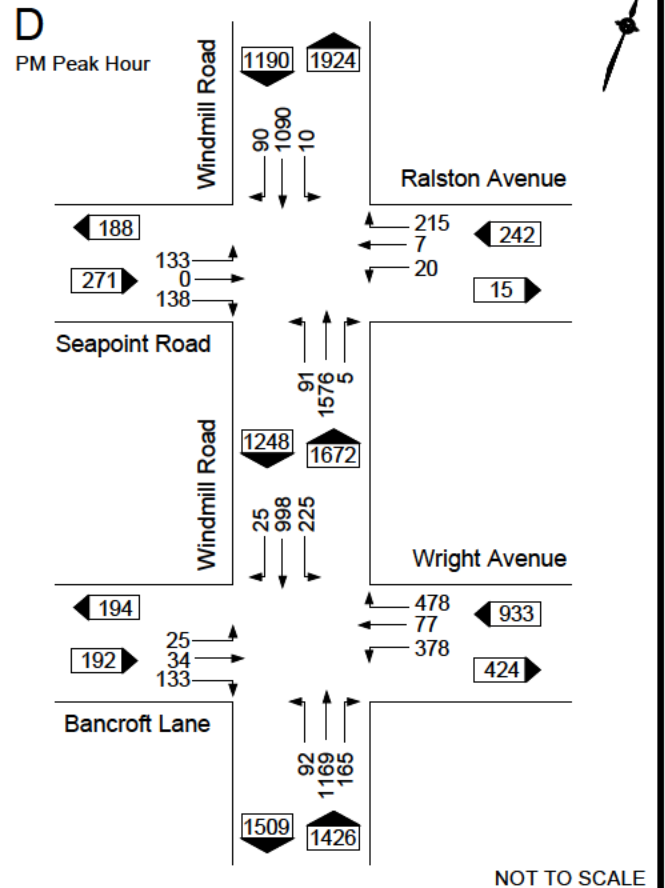
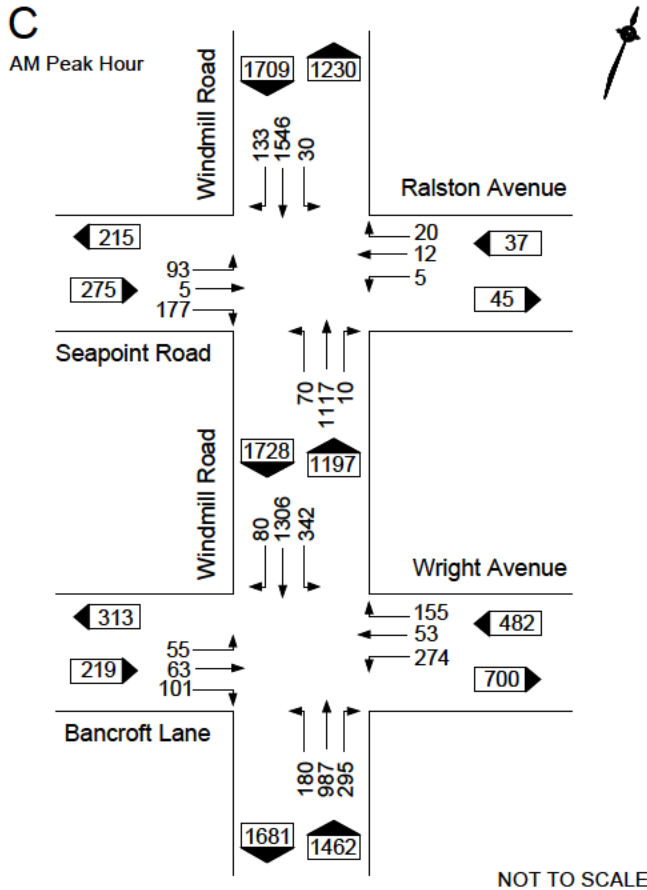
Estimated Site Generated Trips and Projected 2022 Weekday
AM and PM Peak Hour Volumes With Site Development

March 2016

2026 AM and PM Peak Hour Volumes with Highway 107
without Site Generated Trips



2026 AM and PM Peak Hour Volumes with Highway 107
with Site Generated Trips



Traffic Impact Study - Proposed Multi-use Development
Harbour Isle, Dartmouth, NS

Figure A-4

2026 AM and PM Peak Hour Traffic Volumes with Highway 107
Without and With Site Generated Trips

March 2016























Appendix B

Level of Service Analysis

Harbour Isle Traffic Impact Study

1: Windmill Road & Seapoint Road/Ralston Avenue

Page B-1
2016 AM Peak Hour Background Volumes

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	5	65	5	0	20	35	1165	10	30	1860	50
Future Volume (vph)	30	5	65	5	0	20	35	1165	10	30	1860	50
Satd. Flow (prot)	0	1804	1601	1789	1601	0	1789	3579	1601	1789	3579	1601
Flt Permitted		0.738		0.732			0.080			0.208		
Satd. Flow (perm)	0	1390	1601	1379	1601	0	151	3579	1601	392	3579	1601
Satd. Flow (RTOR)			28		93				31			31
Lane Group Flow (vph)	0	38	71	5	22	0	38	1266	11	33	2022	54
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		6
Total Split (s)	38.0	38.0	38.0	38.0	38.0		102.0	102.0	102.0	102.0	102.0	102.0
Total Lost Time (s)		7.0	7.0	7.0	7.0		6.6	6.6	6.6	6.6	6.6	6.6
Act Effct Green (s)		9.8	9.8	9.8	9.8		120.7	120.7	120.7	120.7	120.7	120.7
Actuated g/C Ratio		0.07	0.07	0.07	0.07		0.86	0.86	0.86	0.86	0.86	0.86
v/c Ratio		0.39	0.52	0.05	0.11		0.29	0.41	0.01	0.10	0.66	0.04
Control Delay		73.0	52.6	59.8	1.1		9.6	2.2	0.0	3.2	5.5	1.3
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		73.0	52.6	59.8	1.1		9.6	2.2	0.0	3.2	5.5	1.3
LOS		E	D	E	A		A	A	A	A	A	A
Approach Delay		59.7			12.0			2.4			5.4	
Approach LOS		E			B			A			A	
Queue Length 50th (m)		10.3	11.7	1.3	0.0		0.2	3.3	0.0	1.3	86.8	0.8
Queue Length 95th (m)		21.5	26.9	5.7	0.0		m2.6	42.9	m0.0	4.1	131.0	3.5
Internal Link Dist (m)		139.1			195.9			324.4			495.7	
Turn Bay Length (m)			30.0	10.0			23.0			23.0		25.0
Base Capacity (vph)		307	376	305	426		130	3086	1385	338	3086	1385
Starvation Cap Reductn		0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio		0.12	0.19	0.02	0.05		0.29	0.41	0.01	0.10	0.66	0.04

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 25 (18%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 6.0

Intersection LOS: A













Intersection Capacity Utilization 80.2%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.
























Splits and Phases: 1: Windmill Road & Seapoint Road/Ralston Avenue

					
Ø2 (R)			Ø4		
102 s			38 s		
					
Ø6 (R)			Ø8		
102 s			38 s		

Harbour Isle Traffic Impact Study

2: Windmill Road & Bancroft Lane/Wright Avenue

Page B-2
2016 AM Peak Hour Background Volumes

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	50	65	260	20	165	70	990	280	370	1480	80
Future Volume (vph)	55	50	65	260	20	165	70	990	280	370	1480	80
Satd. Flow (prot)	1789	1723	0	1700	1716	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.950			0.950	0.959		0.077			0.103		
Satd. Flow (perm)	1789	1723	0	1700	1716	1601	145	3579	1601	194	3579	1601
Satd. Flow (RTOR)		37				179			192			129
Lane Group Flow (vph)	60	125	0	153	152	179	76	1076	304	402	1609	87
Turn Type	Split	NA		Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8	2		2	6		6
Total Split (s)	19.0	19.0		44.0	44.0	44.0	12.0	36.0	36.0	41.0	65.0	65.0
Total Lost Time (s)	7.8	7.8		7.8	7.8	7.8	4.0	7.0	7.0	4.0	7.0	7.0
Act Effct Green (s)	10.3	10.3		18.7	18.7	18.7	65.9	55.1	55.1	91.4	76.7	76.7
Actuated g/C Ratio	0.07	0.07		0.13	0.13	0.13	0.47	0.39	0.39	0.65	0.55	0.55
v/c Ratio	0.46	0.78		0.68	0.67	0.49	0.48	0.76	0.41	0.87	0.82	0.09
Control Delay	73.2	75.0		71.8	71.0	11.4	34.0	42.9	15.2	44.9	37.5	4.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.2	75.0		71.8	71.0	11.4	34.0	42.9	15.2	44.9	37.5	4.6
LOS	E	E		E	E	B	C	D	B	D	D	A
Approach Delay		74.4			49.2			36.7			37.6	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	16.1	24.1		42.9	42.6	0.0	7.3	136.3	20.3	82.9	232.2	1.0
Queue Length 95th (m)	31.3	#53.4		63.7	63.6	19.9	24.1	#229.3	55.6	117.7	#279.3	m7.5
Internal Link Dist (m)		86.9			194.0			241.5			324.4	
Turn Bay Length (m)							35.0			70.0		35.0
Base Capacity (vph)	143	171		439	443	546	168	1408	746	555	1959	934
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.73		0.35	0.34	0.33	0.45	0.76	0.41	0.72	0.82	0.09

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 30 (21%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 40.2

Intersection LOS: D

Intersection Capacity Utilization 77.9%

ICU Level of Service D















Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.























Splits and Phases: 2: Windmill Road & Bancroft Lane/Wright Avenue

											
Ø1	Ø2 (R)		Ø4		Ø8						
41 s	36 s		19 s		44 s						
											
Ø5	Ø6 (R)										
12 s	65 s										

Harbour Isle Traffic Impact Study

1: Windmill Road & Seapoint Road/Ralston Avenue

Page B-3
2016 PM Peak Hour Background Volumes

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	0	25	20	5	250	30	1825	5	10	1215	10
Future Volume (vph)	30	0	25	20	5	250	30	1825	5	10	1215	10
Satd. Flow (prot)	0	1789	1601	1789	1607	0	1789	3579	1601	1789	3579	1601
Flt Permitted		0.287		0.736			0.169			0.054		
Satd. Flow (perm)	0	541	1601	1386	1607	0	318	3579	1601	102	3579	1601
Satd. Flow (RTOR)			28		21				31			31
Lane Group Flow (vph)	0	33	27	22	277	0	33	1984	5	11	1321	11
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		6
Total Split (s)	38.0	38.0	38.0	38.0	38.0		102.0	102.0	102.0	102.0	102.0	102.0
Total Lost Time (s)		7.0	7.0	7.0	7.0		6.6	6.6	6.6	6.6	6.6	6.6
Act Effct Green (s)		26.6	26.6	26.6	26.6		99.8	99.8	99.8	99.8	99.8	99.8
Actuated g/C Ratio		0.19	0.19	0.19	0.19		0.71	0.71	0.71	0.71	0.71	0.71
v/c Ratio		0.32	0.08	0.08	0.86		0.15	0.78	0.00	0.15	0.52	0.01
Control Delay		56.2	14.5	45.1	75.0		5.0	11.2	0.0	13.6	10.5	0.2
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.5	0.0	0.0	0.0	0.0
Total Delay		56.2	14.5	45.1	75.0		5.0	11.7	0.0	13.6	10.5	0.2
LOS		E	B	D	E		A	B	A	B	B	A
Approach Delay		37.4			72.8			11.6			10.5	
Approach LOS		D			E			B			B	
Queue Length 50th (m)		7.9	0.0	5.0	68.9		1.9	62.8	0.0	0.9	82.8	0.0
Queue Length 95th (m)		18.4	7.8	12.5	#100.5		m1.5	m293.5	m0.0	4.4	106.1	0.3
Internal Link Dist (m)		139.1			195.9			327.0			495.7	
Turn Bay Length (m)			30.0	10.0			23.0			23.0		25.0
Base Capacity (vph)		119	376	306	372		226	2551	1150	72	2551	1150
Starvation Cap Reductn		0	0	0	0		0	210	0	0	0	0
Spillback Cap Reductn		0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio		0.28	0.07	0.07	0.74		0.15	0.85	0.00	0.15	0.52	0.01

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 15 (11%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 16.5

Intersection LOS: B

Intersection Capacity Utilization 86.7%

ICU Level of Service E





Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.
























Splits and Phases: 1: Windmill Road & Seapoint Road/Ralston Avenue

 Ø2 (R)	 Ø4
102 s	38 s
 Ø6 (R)	 Ø8
102 s	38 s

Harbour Isle Traffic Impact Study

2: Windmill Road & Bancroft Lane/Wright Avenue

Page B-4
2016 PM Peak Hour Background Volumes

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	15	40	365	20	565	25	1270	160	180	1055	25
Future Volume (vph)	25	15	40	365	20	565	25	1270	160	180	1055	25
Satd. Flow (prot)	1789	1678	0	1700	1712	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.950			0.950	0.957		0.150			0.068		
Satd. Flow (perm)	1789	1678	0	1700	1712	1601	283	3579	1601	128	3579	1601
Satd. Flow (RTOR)		43				291			161			129
Lane Group Flow (vph)	27	59	0	210	209	614	27	1380	174	196	1147	27
Turn Type	Split	NA		Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8	2		2	6		6
Total Split (s)	19.0	19.0		44.0	44.0	44.0	12.0	57.0	57.0	20.0	65.0	65.0
Total Lost Time (s)	7.8	7.8		7.8	7.8	7.8	4.0	7.0	7.0	4.0	7.0	7.0
Act Effct Green (s)	7.8	7.8		38.2	38.2	38.2	65.4	55.9	55.9	77.0	67.4	67.4
Actuated g/C Ratio	0.06	0.06		0.27	0.27	0.27	0.47	0.40	0.40	0.55	0.48	0.48
v/c Ratio	0.27	0.44		0.45	0.45	0.95	0.13	0.97	0.24	0.82	0.67	0.03
Control Delay	69.3	35.2		46.0	45.8	50.6	18.5	58.9	6.4	55.2	39.4	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.3	35.2		46.0	45.8	50.6	18.5	58.9	6.4	55.2	39.4	0.3
LOS	E	D		D	D	D	B	E	A	E	D	A
Approach Delay		45.9			48.7			52.4			40.9	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	7.3	4.3		50.2	49.7	98.1	3.5	~224.0	2.3	43.2	177.7	0.0
Queue Length 95th (m)	17.0	18.4		78.4	77.8	#180.4	8.4	#266.6	17.9	#74.2	195.5	m0.0
Internal Link Dist (m)		86.9			194.0			368.4			327.0	
Turn Bay Length (m)							35.0			70.0		35.0
Base Capacity (vph)	143	173		467	470	650	221	1429	736	260	1722	837
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.34		0.45	0.44	0.94	0.12	0.97	0.24	0.75	0.67	0.03

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 47.5

Intersection LOS: D

Intersection Capacity Utilization 93.1%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.






















Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.






















Splits and Phases: 2: Windmill Road & Bancroft Lane/Wright Avenue

														
Ø1			Ø2 (R)			Ø4			Ø8					
20 s			57 s			19 s			44 s					
														
Ø5			Ø6 (R)											
12 s			65 s											

Harbour Isle Traffic Impact Study

1: Windmill Road & Seapoint Road/Ralston Avenue

Page B-5
2026 AM Peak Hour Background Volumes

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	5	106	5	2	20	41	1217	10	30	1946	68
Future Volume (vph)	54	5	106	5	2	20	41	1217	10	30	1946	68
Satd. Flow (prot)	0	1801	1601	0	1676	0	1789	3579	1601	1789	3579	1601
Flt Permitted		0.722			0.936		0.046			0.207		
Satd. Flow (perm)	0	1360	1601	0	1583	0	87	3579	1601	390	3579	1601
Satd. Flow (RTOR)			115		22				31			62
Lane Group Flow (vph)	0	64	115	0	29	0	45	1323	11	33	2115	74
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2		2	6		6
Total Split (s)	37.0	37.0	37.0	37.0	37.0		14.0	103.0	103.0	89.0	89.0	89.0
Total Lost Time (s)		7.0	7.0		7.0		4.0	6.6	6.6	6.6	6.6	6.6
Act Effct Green (s)		12.0	12.0		12.0		117.0	114.4	114.4	105.6	105.6	105.6
Actuated g/C Ratio		0.09	0.09		0.09		0.84	0.82	0.82	0.75	0.75	0.75
v/c Ratio		0.55	0.48		0.19		0.29	0.45	0.01	0.11	0.78	0.06
Control Delay		77.8	16.3		28.7		21.3	13.1	2.8	7.2	14.4	2.0
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		77.8	16.3		28.7		21.3	13.1	2.8	7.2	14.4	2.0
LOS		E	B		C		C	B	A	A	B	A
Approach Delay		38.3			28.7			13.3			13.9	
Approach LOS		D			C			B			B	
Queue Length 50th (m)		17.3	0.0		1.8		5.9	68.6	0.0	2.3	175.6	0.8
Queue Length 95th (m)		31.8	17.8		11.4		m9.9	m115.5	m0.2	6.8	242.2	5.5
Internal Link Dist (m)		139.1			195.9			324.4			495.7	
Turn Bay Length (m)			30.0				23.0			23.0		25.0
Base Capacity (vph)		291	433		356		194	2924	1313	294	2698	1222
Starvation Cap Reductn		0	0		0		0	0	0	0	0	0
Spillback Cap Reductn		0	0		0		0	0	0	0	0	0
Storage Cap Reductn		0	0		0		0	0	0	0	0	0
Reduced v/c Ratio		0.22	0.27		0.08		0.23	0.45	0.01	0.11	0.78	0.06

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 15.0

Intersection LOS: B

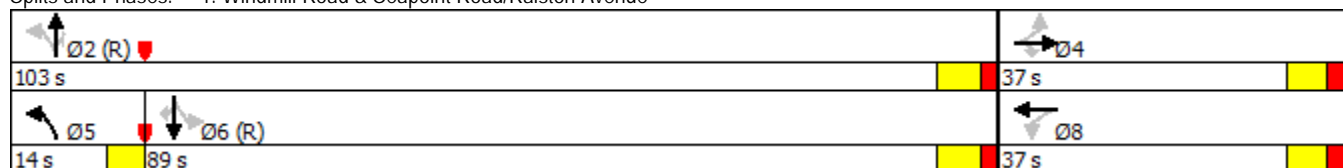
Intersection Capacity Utilization 83.4%

ICU Level of Service E

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.
























Splits and Phases: 1: Windmill Road & Seapoint Road/Ralston Avenue



Harbour Isle Traffic Impact Study

2: Windmill Road & Bancroft Lane/Wright Avenue

Page B-6
2026 AM Peak Hour Background Volumes

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	59	85	274	27	176	93	1037	295	407	1570	80
Future Volume (vph)	55	59	85	274	27	176	93	1037	295	407	1570	80
Satd. Flow (prot)	1789	1718	0	1700	1719	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.950			0.950	0.961		0.091			0.084		
Satd. Flow (perm)	1789	1718	0	1700	1719	1601	171	3579	1601	158	3579	1601
Satd. Flow (RTOR)		41				191			197			129
Lane Group Flow (vph)	60	156	0	164	163	191	101	1127	321	442	1707	87
Turn Type	Split	NA		Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8	2		2	6		6
Total Split (s)	23.0	23.0		44.0	44.0	44.0	26.0	38.0	38.0	35.0	47.0	47.0
Total Lost Time (s)	7.8	7.8		7.8	7.8	7.8	4.0	7.0	7.0	4.0	7.0	7.0
Act Effct Green (s)	13.3	13.3		19.5	19.5	19.5	56.1	43.8	43.8	87.6	71.3	71.3
Actuated g/C Ratio	0.10	0.10		0.14	0.14	0.14	0.40	0.31	0.31	0.63	0.51	0.51
v/c Ratio	0.36	0.78		0.69	0.68	0.49	0.58	1.01	0.50	0.84	0.94	0.10
Control Delay	64.5	70.7		71.7	70.7	11.0	42.2	75.6	19.8	51.3	49.7	7.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.5	70.7		71.7	70.7	11.0	42.2	75.6	19.8	51.3	49.7	7.0
LOS	E	E		E	E	B	D	E	B	D	D	A
Approach Delay		68.9			49.0			61.9			48.3	
Approach LOS		E			D			E			D	
Queue Length 50th (m)	15.6	31.2		46.1	45.6	0.0	11.5	~183.0	27.4	120.9	204.1	0.8
Queue Length 95th (m)	30.3	#59.6		67.5	66.7	20.0	32.2	#262.9	63.5	#157.9	#335.2	m4.9
Internal Link Dist (m)		86.9			194.0			241.5			324.4	
Turn Bay Length (m)							35.0			70.0		
Base Capacity (vph)	194	223		439	444	555	338	1120	636	527	1823	878
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.70		0.37	0.37	0.34	0.30	1.01	0.50	0.84	0.94	0.10

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 30 (21%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 54.0

Intersection LOS: D

Intersection Capacity Utilization 90.0%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.









Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.























Splits and Phases: 2: Windmill Road & Bancroft Lane/Wright Avenue

				
Ø1	Ø2 (R)		Ø4	Ø8
35 s	38 s		23 s	44 s
				
Ø5	Ø6 (R)			
26 s	47 s			

Harbour Isle Traffic Impact Study

1: Windmill Road & Seapoint Road/Ralston Avenue

Page B-7
2026 PM Peak Hour Background Volumes

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	0	60	20	6	265	52	1906	5	10	1270	43
Future Volume (vph)	68	0	60	20	6	265	52	1906	5	10	1270	43
Satd. Flow (prot)	0	1789	1601	1789	1608	0	1789	3579	1601	1789	3579	1601
Flt Permitted		0.262		0.709			0.154			0.041		
Satd. Flow (perm)	0	493	1601	1335	1608	0	290	3579	1601	77	3579	1601
Satd. Flow (RTOR)			65		18				31			31
Lane Group Flow (vph)	0	74	65	22	295	0	57	2072	5	11	1380	47
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		6
Total Split (s)	37.0	37.0	37.0	37.0	37.0		103.0	103.0	103.0	103.0	103.0	103.0
Total Lost Time (s)		7.0	7.0	7.0	7.0		6.6	6.6	6.6	6.6	6.6	6.6
Act Effect Green (s)		27.5	27.5	27.5	27.5		98.9	98.9	98.9	98.9	98.9	98.9
Actuated g/C Ratio		0.20	0.20	0.20	0.20		0.71	0.71	0.71	0.71	0.71	0.71
v/c Ratio		0.77	0.18	0.08	0.90		0.28	0.82	0.00	0.20	0.55	0.04
Control Delay		97.4	11.1	45.3	80.1		5.9	10.5	0.0	18.5	11.1	3.4
Queue Delay		0.0	0.0	0.0	0.0		0.0	1.1	0.0	0.0	0.0	0.0
Total Delay		97.4	11.1	45.3	80.1		5.9	11.6	0.0	18.5	11.1	3.4
LOS		F	B	D	F		A	B	A	B	B	A
Approach Delay		57.0			77.7			11.4			10.9	
Approach LOS		E			E			B			B	
Queue Length 50th (m)		19.1	0.0	4.9	74.3		3.1	62.1	0.0	1.0	93.9	1.3
Queue Length 95th (m)		#44.9	12.3	12.6	#119.4		m3.0	m60.3	m0.0	5.1	110.6	5.2
Internal Link Dist (m)		139.1			195.9			324.4			495.7	
Turn Bay Length (m)			30.0	10.0			23.0			23.0		25.0
Base Capacity (vph)		105	394	286	358		204	2528	1140	54	2528	1140
Starvation Cap Reductn		0	0	0	0		0	230	0	0	0	0
Spillback Cap Reductn		0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio		0.70	0.16	0.08	0.82		0.28	0.90	0.00	0.20	0.55	0.04

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 15 (11%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 18.0

Intersection LOS: B

Intersection Capacity Utilization 92.4%

ICU Level of Service F

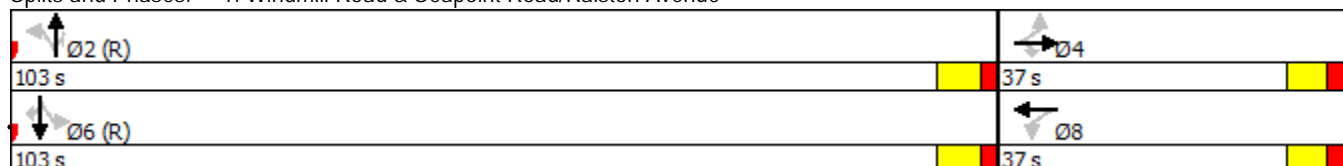
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.
























Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Windmill Road & Seapoint Road/Ralston Avenue



Page B-8

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	21	72	378	44	595	54	1343	165	213	1112	25
Future Volume (vph)	25	21	72	378	44	595	54	1343	165	213	1112	25
Satd. Flow (prot)	1789	1665	0	1700	1721	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.950			0.950	0.962		0.111			0.072		
Satd. Flow (perm)	1789	1665	0	1700	1721	1601	209	3579	1601	136	3579	1601
Satd. Flow (RTOR)		78				276			161			129
Lane Group Flow (vph)	27	101	0	230	229	647	59	1460	179	232	1209	27
Turn Type	Split	NA		Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8	2		2	6		6
Total Split (s)	18.0	18.0		44.0	44.0	44.0	12.0	58.0	58.0	20.0	66.0	66.0
Total Lost Time (s)	7.8	7.8		7.8	7.8	7.8	4.0	7.0	7.0	4.0	7.0	7.0
Act Effct Green (s)	7.9	7.9		38.5	38.5	38.5	61.9	51.6	51.6	74.0	61.7	61.7
Actuated g/C Ratio	0.06	0.06		0.28	0.28	0.28	0.44	0.37	0.37	0.53	0.44	0.44
v/c Ratio	0.27	0.60		0.49	0.48	1.01	0.34	1.11	0.26	0.92	0.77	0.03
Control Delay	69.1	35.4		47.4	47.1	67.0	22.4	101.1	6.8	65.7	42.2	0.1
Queue Delay	0.8	0.0		0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.9	35.4		47.4	47.1	70.7	22.4	101.1	6.8	65.7	42.2	0.1
LOS	E	D		D	D	E	C	F	A	E	D	A
Approach Delay		42.7			61.0			88.4			45.1	
Approach LOS		D			E			F			D	
Queue Length 50th (m)	7.3	6.2		56.2	55.8	~120.7	7.7	~244.3	3.2	47.2	180.9	0.0
Queue Length 95th (m)	17.1	24.8		86.0	85.4	#207.2	15.0	#286.9	18.9	#94.5	203.1	m0.0
Internal Link Dist (m)		86.9			194.0			368.4			324.4	
Turn Bay Length (m)							35.0			70.0		
Base Capacity (vph)	130	193		467	473	640	183	1318	691	260	1576	777
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	28	0		0	0	8	0	11	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.52		0.49	0.48	1.02	0.32	1.12	0.26	0.89	0.77	0.03

Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.11	
Intersection Signal Delay: 65.8	Intersection LOS: E
Intersection Capacity Utilization 98.3%	ICU Level of Service F
Analysis Period (min) 15	

Queue shown is maximum after two cycles.

Queue shown is maximum after two cycles.






















- m Volume for 95th percentile queue is metered by upstream signal.

20 s		58 s		18 s		44 s	
12 s		66 s					

Harbour Isle Traffic Impact Study

1: Windmill Road & Seapoint Road/Ralston Avenue

Page B-9
2026 AM Peak Hour Volumes with Site Generated Trips

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	5	177	5	12	20	70	1217	10	30	1946	133
Future Volume (vph)	93	5	177	5	12	20	70	1217	10	30	1946	133
Satd. Flow (prot)	0	1799	1601	0	1734	0	1789	3579	1601	1789	3579	1601
Flt Permitted		0.707			0.956		0.039			0.207		
Satd. Flow (perm)	0	1332	1601	0	1667	0	73	3579	1601	390	3579	1601
Satd. Flow (RTOR)			125		22				31			62
Lane Group Flow (vph)	0	106	192	0	40	0	76	1323	11	33	2115	145
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2		2	6		6
Total Split (s)	37.0	37.0	37.0	37.0	37.0		14.0	103.0	103.0	89.0	89.0	89.0
Total Lost Time (s)		7.0	7.0		7.0		4.0	6.6	6.6	6.6	6.6	6.6
Act Effct Green (s)		16.5	16.5		16.5		112.5	109.9	109.9	98.0	98.0	98.0
Actuated g/C Ratio		0.12	0.12		0.12		0.80	0.78	0.78	0.70	0.70	0.70
v/c Ratio		0.68	0.64		0.19		0.49	0.47	0.01	0.12	0.84	0.13
Control Delay		79.5	31.0		31.2		29.1	17.6	3.2	10.0	20.8	5.0
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		79.5	31.0		31.2		29.1	17.6	3.2	10.0	20.8	5.0
LOS		E	C		C		C	B	A	A	C	A
Approach Delay		48.3			31.2			18.1			19.7	
Approach LOS		D			C			B			B	
Queue Length 50th (m)		28.6	17.4		4.5		16.1	91.5	0.1	2.7	202.0	6.5
Queue Length 95th (m)		46.4	41.0		15.0		m16.6	m88.3	m0.1	8.7	308.7	17.1
Internal Link Dist (m)		139.1			195.9			324.4			495.7	
Turn Bay Length (m)			30.0				23.0			23.0		25.0
Base Capacity (vph)		285	441		374		183	2810	1263	272	2504	1139
Starvation Cap Reductn		0	0		0		0	0	0	0	0	0
Spillback Cap Reductn		0	0		0		0	0	0	0	0	0
Storage Cap Reductn		0	0		0		0	0	0	0	0	0
Reduced v/c Ratio		0.37	0.44		0.11		0.42	0.47	0.01	0.12	0.84	0.13

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 21.3

Intersection LOS: C








Intersection Capacity Utilization 87.8%

ICU Level of Service E

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.
























Splits and Phases: 1: Windmill Road & Seapoint Road/Ralston Avenue

 Ø2 (R) 	 Ø4
103 s	37 s
 Ø5 	 Ø8
14 s	37 s
 Ø6 (R)	
89 s	

Harbour Isle Traffic Impact Study

2: Windmill Road & Bancroft Lane/Wright Avenue

Page B-10
2026 AM Peak Hour Volumes with Site Generated Trips

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	63	101	274	53	205	180	1037	295	442	1606	80
Future Volume (vph)	55	63	101	274	53	205	180	1037	295	442	1606	80
Satd. Flow (prot)	1789	1708	0	1700	1730	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.950			0.950	0.967		0.109			0.099		
Satd. Flow (perm)	1789	1708	0	1700	1730	1601	205	3579	1601	186	3579	1601
Satd. Flow (RTOR)		47				223			197			129
Lane Group Flow (vph)	60	178	0	176	180	223	196	1127	321	480	1746	87
Turn Type	Split	NA		Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8	2		2	6		6
Total Split (s)	23.0	23.0		44.0	44.0	44.0	26.0	38.0	38.0	35.0	47.0	47.0
Total Lost Time (s)	7.8	7.8		7.8	7.8	7.8	4.0	7.0	7.0	4.0	7.0	7.0
Act Effct Green (s)	13.9	13.9		20.9	20.9	20.9	54.9	36.6	36.6	85.5	63.2	63.2
Actuated g/C Ratio	0.10	0.10		0.15	0.15	0.15	0.39	0.26	0.26	0.61	0.45	0.45
v/c Ratio	0.34	0.84		0.69	0.70	0.52	0.77	1.21	0.57	0.81	1.08	0.11
Control Delay	63.6	76.3		69.9	69.9	10.3	56.3	146.7	22.3	46.5	90.8	9.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.6	76.3		69.9	69.9	10.3	56.3	146.7	22.3	46.5	90.8	9.3
LOS	E	E		E	E	B	E	F	C	D	F	A
Approach Delay		73.1			46.9			111.6			78.6	
Approach LOS		E			D			F			E	
Queue Length 50th (m)	15.6	36.0		49.3	50.5	0.0	35.3	~206.2	29.3	128.5	~284.6	0.9
Queue Length 95th (m)	30.3	#72.0		70.6	72.1	21.2	61.2	#262.9	63.5	m#163.3	#391.8	m4.9
Internal Link Dist (m)		86.9			194.0			241.5			324.4	
Turn Bay Length (m)							35.0			70.0		
Base Capacity (vph)	194	227		439	447	579	341	934	563	594	1614	793
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.78		0.40	0.40	0.39	0.57	1.21	0.57	0.81	1.08	0.11

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 30 (21%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.21

Intersection Signal Delay: 85.9

Intersection LOS: F

Intersection Capacity Utilization 95.0%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

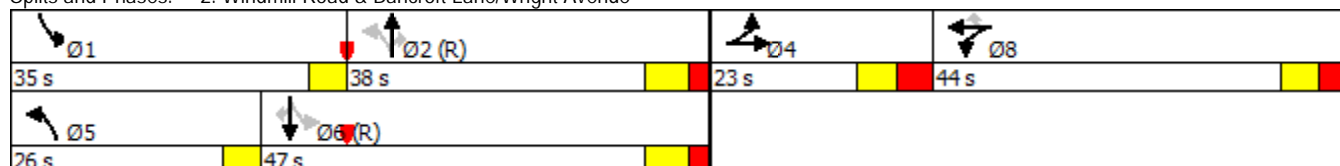
Queue shown is maximum after two cycles.




95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Windmill Road & Bancroft Lane/Wright Avenue
























 Ø1		 Ø2 (R)		 Ø4		 Ø8	
20 s		58 s		18 s		44 s	
 Ø5		 Ø6 (R)					
12 s		66 s					

Harbour Isle Traffic Impact Study

1: Windmill Road & Seapoint Road/Ralston Avenue

Page B-13
2026 AM Peak Hour Background Volumes with Hwy 107

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	5	106	5	2	20	41	1117	10	30	1546	68
Future Volume (vph)	54	5	106	5	2	20	41	1117	10	30	1546	68
Satd. Flow (prot)	0	1801	1601	0	1676	0	1789	3579	1601	1789	3579	1601
Flt Permitted		0.722			0.936		0.103			0.231		
Satd. Flow (perm)	0	1360	1601	0	1583	0	194	3579	1601	435	3579	1601
Satd. Flow (RTOR)			115		22				31			62
Lane Group Flow (vph)	0	64	115	0	29	0	45	1214	11	33	1680	74
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2		2	6		6
Total Split (s)	37.0	37.0	37.0	37.0	37.0		14.0	103.0	103.0	89.0	89.0	89.0
Total Lost Time (s)		7.0	7.0		7.0		4.0	6.6	6.6	6.6	6.6	6.6
Act Effct Green (s)		12.0	12.0		12.0		117.0	114.4	114.4	105.6	105.6	105.6
Actuated g/C Ratio		0.09	0.09		0.09		0.84	0.82	0.82	0.75	0.75	0.75
v/c Ratio		0.55	0.48		0.19		0.19	0.42	0.01	0.10	0.62	0.06
Control Delay		77.8	16.3		28.7		8.9	7.5	2.1	6.9	10.2	2.0
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		77.8	16.3		28.7		8.9	7.5	2.1	6.9	10.2	2.0
LOS		E	B		C		A	A	A	A	B	A
Approach Delay		38.3			28.7			7.5			9.8	
Approach LOS		D			C			A			A	
Queue Length 50th (m)		17.3	0.0		1.8		1.2	23.6	0.0	2.3	107.4	0.8
Queue Length 95th (m)		31.8	17.8		11.4		m5.5	97.5	m0.3	6.7	147.9	5.5
Internal Link Dist (m)		139.1			195.9			324.4			495.7	
Turn Bay Length (m)			30.0				23.0			23.0		25.0
Base Capacity (vph)		291	433		356		276	2924	1313	327	2698	1222
Starvation Cap Reductn		0	0		0		0	0	0	0	0	0
Spillback Cap Reductn		0	0		0		0	0	0	0	0	0
Storage Cap Reductn		0	0		0		0	0	0	0	0	0
Reduced v/c Ratio		0.22	0.27		0.08		0.16	0.42	0.01	0.10	0.62	0.06

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 10.6

Intersection LOS: B







Intersection Capacity Utilization 72.3%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.
























Splits and Phases: 1: Windmill Road & Seapoint Road/Ralston Avenue

		
Ø2 (R)		Ø4
103 s		37 s
		
Ø5	Ø6 (R)	Ø8
14 s	89 s	37 s

Harbour Isle Traffic Impact Study

2: Windmill Road & Bancroft Lane/Wright Avenue

Page B-14
2026 AM Peak Hour Background Volumes with Hwy 107

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	59	85	274	27	126	93	987	295	307	1270	80
Future Volume (vph)	55	59	85	274	27	126	93	987	295	307	1270	80
Satd. Flow (prot)	1789	1718	0	1700	1719	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.950			0.950	0.961		0.116			0.104		
Satd. Flow (perm)	1789	1718	0	1700	1719	1601	218	3579	1601	196	3579	1601
Satd. Flow (RTOR)		41				154			206			129
Lane Group Flow (vph)	60	156	0	164	163	137	101	1073	321	334	1380	87
Turn Type	Split	NA		Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8	2		2	6		6
Total Split (s)	23.0	23.0		44.0	44.0	44.0	26.0	38.0	38.0	35.0	47.0	47.0
Total Lost Time (s)	7.8	7.8		7.8	7.8	7.8	4.0	7.0	7.0	4.0	7.0	7.0
Act Effct Green (s)	13.3	13.3		19.4	19.4	19.4	66.8	54.8	54.8	87.7	71.7	71.7
Actuated g/c Ratio	0.10	0.10		0.14	0.14	0.14	0.48	0.39	0.39	0.63	0.51	0.51
v/c Ratio	0.36	0.78		0.70	0.69	0.39	0.49	0.77	0.43	0.80	0.75	0.10
Control Delay	64.5	70.7		72.5	71.4	8.3	27.2	43.3	15.0	49.9	39.4	7.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.5	70.7		72.5	71.4	8.3	27.2	43.3	15.0	49.9	39.4	7.3
LOS	E	E		E	E	A	C	D	B	D	D	A
Approach Delay		68.9			53.1			36.2			39.8	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	15.6	31.2		46.4	46.1	0.0	10.8	137.5	21.2	78.8	151.6	0.7
Queue Length 95th (m)	30.3	#59.6		67.5	66.7	13.6	26.7	#225.4	57.2	117.4	#206.3	m9.8
Internal Link Dist (m)		86.9			194.0			241.5			324.4	
Turn Bay Length (m)							35.0			70.0		
Base Capacity (vph)	194	223		439	444	528	370	1400	752	483	1833	882
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.70		0.37	0.37	0.26	0.27	0.77	0.43	0.69	0.75	0.10

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 30 (21%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 41.6

Intersection LOS: D

Intersection Capacity Utilization 83.1%

ICU Level of Service E

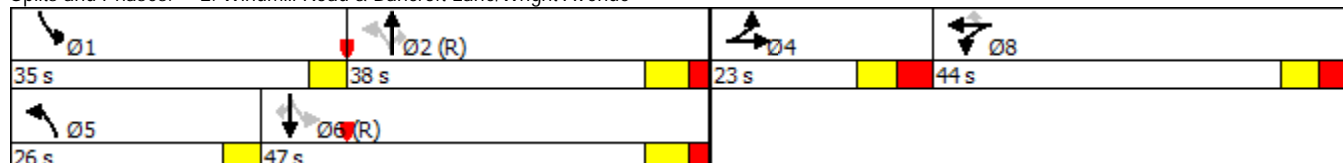
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.























Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Windmill Road & Bancroft Lane/Wright Avenue



1: Windmill Road & Seapoint Road/Ralston Avenue 2026 PM Peak Hour Background Volumes with Highway 107

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	0	60	20	6	215	52	1576	5	10	1090	43
Future Volume (vph)	68	0	60	20	6	215	52	1576	5	10	1090	43
Satd. Flow (prot)	0	1789	1601	1789	1608	0	1789	3579	1601	1789	3579	1601
Flt Permitted		0.314		0.709			0.209			0.099		
Satd. Flow (perm)	0	591	1601	1335	1608	0	394	3579	1601	186	3579	1601
Satd. Flow (RTOR)			65		38				31			31
Lane Group Flow (vph)	0	74	65	22	241	0	57	1713	5	11	1185	47
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		6
Total Split (s)	37.0	37.0	37.0	37.0	37.0		103.0	103.0	103.0	103.0	103.0	103.0
Total Lost Time (s)		7.0	7.0	7.0	7.0		6.6	6.6	6.6	6.6	6.6	6.6
Act Effect Green (s)		22.9	22.9	22.9	22.9		103.5	103.5	103.5	103.5	103.5	103.5
Actuated g/C Ratio		0.16	0.16	0.16	0.16		0.74	0.74	0.74	0.74	0.74	0.74
v/c Ratio		0.77	0.21	0.10	0.82		0.20	0.65	0.00	0.08	0.45	0.04
Control Delay		99.6	11.6	47.9	68.7		4.6	5.9	0.0	8.2	8.3	3.1
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		99.6	11.6	47.9	68.7		4.6	5.9	0.0	8.2	8.3	3.1
LOS		F	B	D	E		A	A	A	A	A	A
Approach Delay		58.4			67.0			5.8			8.1	
Approach LOS		E			E			A			A	
Queue Length 50th (m)		19.8	0.0	5.2	55.3		1.9	44.7	0.0	0.8	60.7	1.1
Queue Length 95th (m)		#38.9	12.3	12.6	81.1		m3.9	53.6	m0.0	3.4	87.9	5.2
Internal Link Dist (m)		139.1			195.9			324.4			495.7	
Turn Bay Length (m)			30.0	10.0			23.0			23.0		25.0
Base Capacity (vph)		126	394	286	374		291	2646	1192	137	2646	1192
Starvation Cap Reductn		0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio		0.59	0.16	0.08	0.64		0.20	0.65	0.00	0.08	0.45	0.04

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 15 (11%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 13.5

Intersection LOS: B

Intersection Capacity Utilization 80.2%

ICU Level of Service D

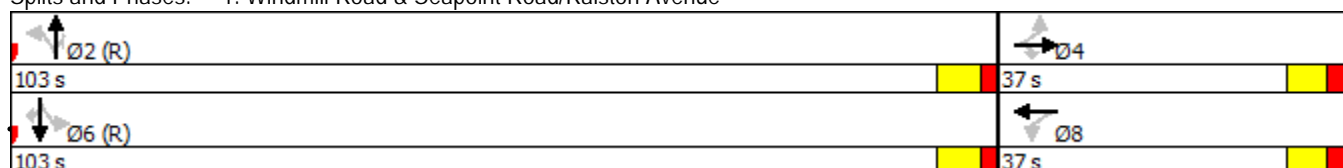
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.
























m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Windmill Road & Seapoint Road/Ralston Avenue



2: Windmill Road & Bancroft Lane/Wright Avenue

2026 PM Peak Hour Background Volumes with Highway 107

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	21	72	378	44	465	54	1143	165	173	972	25
Future Volume (vph)	25	21	72	378	44	465	54	1143	165	173	972	25
Satd. Flow (prot)	1789	1665	0	1700	1721	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.950			0.950	0.962		0.198			0.083		
Satd. Flow (perm)	1789	1665	0	1700	1721	1601	373	3579	1601	156	3579	1601
Satd. Flow (RTOR)		78				280			161			129
Lane Group Flow (vph)	27	101	0	230	229	505	59	1242	179	188	1057	27
Turn Type	Split	NA		Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8	2		2	6		6
Total Split (s)	18.0	18.0		44.0	44.0	44.0	12.0	58.0	58.0	20.0	66.0	66.0
Total Lost Time (s)	7.8	7.8		7.8	7.8	7.8	4.0	7.0	7.0	4.0	7.0	7.0
Act Effect Green (s)	7.9	7.9		29.8	29.8	29.8	71.9	61.8	61.8	82.7	70.5	70.5
Actuated g/C Ratio	0.06	0.06		0.21	0.21	0.21	0.51	0.44	0.44	0.59	0.50	0.50
v/c Ratio	0.27	0.60		0.64	0.63	0.90	0.22	0.79	0.22	0.74	0.59	0.03
Control Delay	69.1	35.4		57.3	56.7	42.8	17.2	39.9	6.5	45.1	35.2	0.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.1	35.4		57.3	56.7	42.8	17.2	39.9	6.5	45.1	35.2	0.5
LOS	E	D		E	E	D	B	D	A	D	D	A
Approach Delay		42.5			49.6			35.0			35.9	
Approach LOS		D			D			C			D	
Queue Length 50th (m)	7.3	6.2		59.6	59.2	64.9	7.0	161.9	2.9	39.8	122.1	0.0
Queue Length 95th (m)	17.1	24.8		86.0	85.4	#110.9	15.0	#220.7	18.9	#59.0	173.2	m0.7
Internal Link Dist (m)		86.9			194.0			368.4			324.4	
Turn Bay Length (m)							35.0			70.0		
Base Capacity (vph)	130	193		440	446	622	274	1578	796	278	1801	869
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.52		0.52	0.51	0.81	0.22	0.79	0.22	0.68	0.59	0.03

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 39.2

Intersection LOS: D

Intersection Capacity Utilization 84.8%

ICU Level of Service E

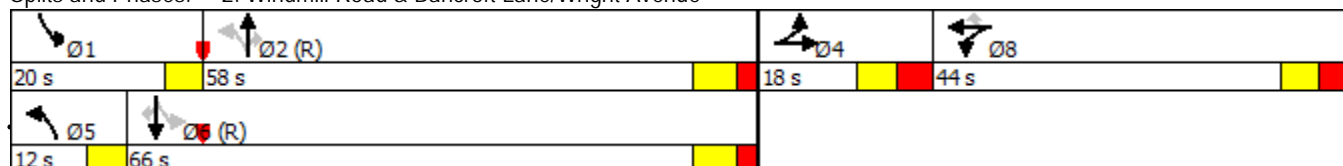
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.






















Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Windmill Road & Bancroft Lane/Wright Avenue



1: Windmill Road & Seapoint Road/Ralston Avenue 2026 AM Peak Hour Volumes with Site Generated Trips and Hwy 107

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	5	177	5	12	20	70	1117	10	30	1546	133
Future Volume (vph)	93	5	177	5	12	20	70	1117	10	30	1546	133
Satd. Flow (prot)	0	1799	1601	0	1734	0	1789	3579	1601	1789	3579	1601
Flt Permitted		0.707			0.956		0.091			0.231		
Satd. Flow (perm)	0	1332	1601	0	1667	0	171	3579	1601	435	3579	1601
Satd. Flow (RTOR)			138		22				31			62
Lane Group Flow (vph)	0	106	192	0	40	0	76	1214	11	33	1680	145
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2		2	6		6
Total Split (s)	37.0	37.0	37.0	37.0	37.0		14.0	103.0	103.0	89.0	89.0	89.0
Total Lost Time (s)		7.0	7.0		7.0		4.0	6.6	6.6	6.6	6.6	6.6
Act Effct Green (s)		16.5	16.5		16.5		112.5	109.9	109.9	98.3	98.3	98.3
Actuated g/C Ratio		0.12	0.12		0.12		0.80	0.78	0.78	0.70	0.70	0.70
v/c Ratio		0.68	0.62		0.19		0.34	0.43	0.01	0.11	0.67	0.13
Control Delay		79.5	26.6		31.2		20.4	11.0	2.9	9.3	14.2	4.8
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		79.5	26.6		31.2		20.4	11.0	2.9	9.3	14.2	4.8
LOS		E	C		C		C	B	A	A	B	A
Approach Delay		45.4			31.2			11.4			13.4	
Approach LOS		D			C			B			B	
Queue Length 50th (m)		28.6	13.9		4.5		6.3	30.1	0.0	2.6	123.6	6.5
Queue Length 95th (m)		46.4	37.2		15.0		m17.3	118.1	m0.3	8.3	184.9	16.7
Internal Link Dist (m)		139.1			195.9			324.4			495.7	
Turn Bay Length (m)			30.0				23.0			23.0		25.0
Base Capacity (vph)		285	451		374		252	2810	1263	305	2513	1143
Starvation Cap Reductn		0	0		0		0	0	0	0	0	0
Spillback Cap Reductn		0	0		0		0	0	0	0	0	0
Storage Cap Reductn		0	0		0		0	0	0	0	0	0
Reduced v/c Ratio		0.37	0.43		0.11		0.30	0.43	0.01	0.11	0.67	0.13

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 15.6

Intersection LOS: B

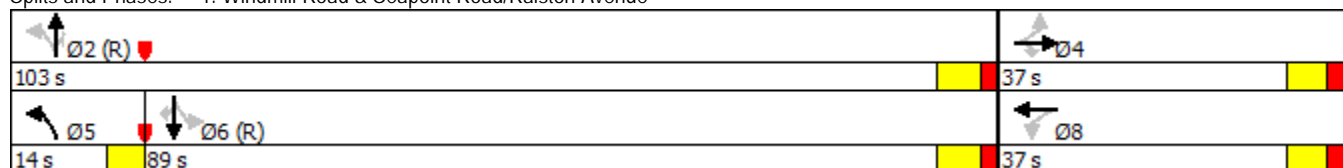
Intersection Capacity Utilization 76.7%

ICU Level of Service D

Analysis Period (min) 15
























m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Windmill Road & Seapoint Road/Ralston Avenue



2: Windmill Road & Bancroft Lane/Wright Avenue

2026 AM Peak Hour Volumes with Site Generated Trips and Hwy 107

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	63	101	274	53	155	180	987	295	342	1306	80
Future Volume (vph)	55	63	101	274	53	155	180	987	295	342	1306	80
Satd. Flow (prot)	1789	1708	0	1700	1730	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.950			0.950	0.967		0.081			0.075		
Satd. Flow (perm)	1789	1708	0	1700	1730	1601	153	3579	1601	141	3579	1601
Satd. Flow (RTOR)		47				168		206			129	
Lane Group Flow (vph)	60	178	0	176	180	168	196	1073	321	372	1420	87
Turn Type	Split	NA		Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8	2		2	6		6
Total Split (s)	23.0	23.0		44.0	44.0	44.0	26.0	38.0	38.0	35.0	47.0	47.0
Total Lost Time (s)	7.8	7.8		7.8	7.8	7.8	4.0	7.0	7.0	4.0	7.0	7.0
Act Effct Green (s)	13.9	13.9		20.6	20.6	20.6	66.7	49.4	49.4	85.9	64.5	64.5
Actuated g/C Ratio	0.10	0.10		0.15	0.15	0.15	0.48	0.35	0.35	0.61	0.46	0.46
v/c Ratio	0.34	0.84		0.70	0.71	0.44	0.82	0.85	0.46	0.86	0.86	0.11
Control Delay	63.6	76.3		71.2	71.2	10.5	61.9	50.4	16.9	55.3	51.0	10.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.6	76.3		71.2	71.2	10.5	61.9	50.4	16.9	55.3	51.0	10.4
LOS	E	E		E	E	B	E	D	B	E	D	B
Approach Delay		73.1			51.8			45.1			50.0	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	15.6	36.0		49.3	50.5	0.0	37.7	147.0	22.9	93.7	173.2	1.5
Queue Length 95th (m)	30.3	#72.0		71.2	72.6	18.8	65.5	#245.1	60.5	132.6	#288.0	m10.7
Internal Link Dist (m)		86.9			194.0			241.5			324.4	
Turn Bay Length (m)							35.0			70.0		
Base Capacity (vph)	194	227		439	447	538	340	1262	697	473	1649	807
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.78		0.40	0.40	0.31	0.58	0.85	0.46	0.79	0.86	0.11

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 30 (21%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 49.7

Intersection LOS: D

Intersection Capacity Utilization 86.9%

ICU Level of Service E

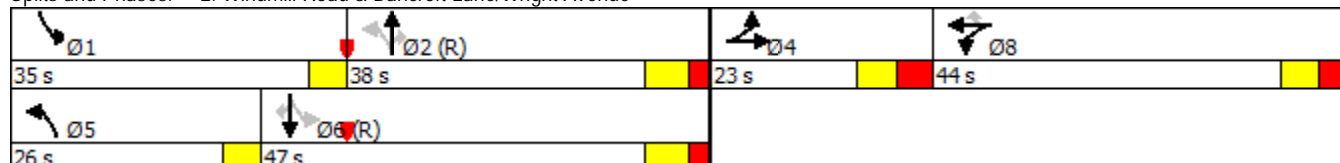
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.























Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Windmill Road & Bancroft Lane/Wright Avenue



1: Windmill Road & Seapoint Road/Ralston Avenue 2026 PM Peak Hour Volumes with Site Generated Trips and Hwy 107

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	133	0	138	20	7	215	91	1576	5	10	1090	90
Future Volume (vph)	133	0	138	20	7	215	91	1576	5	10	1090	90
Satd. Flow (prot)	0	1789	1601	1789	1610	0	1789	3579	1601	1789	3579	1601
Flt Permitted		0.420		0.612			0.194			0.082		
Satd. Flow (perm)	0	791	1601	1153	1610	0	365	3579	1601	154	3579	1601
Satd. Flow (RTOR)			112		38				31			56
Lane Group Flow (vph)	0	145	150	22	242	0	99	1713	5	11	1185	98
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		6
Total Split (s)	37.0	37.0	37.0	37.0	37.0		103.0	103.0	103.0	103.0	103.0	103.0
Total Lost Time (s)		7.0	7.0	7.0	7.0		6.6	6.6	6.6	6.6	6.6	6.6
Act Effct Green (s)		31.7	31.7	31.7	31.7		94.7	94.7	94.7	94.7	94.7	94.7
Actuated g/C Ratio		0.23	0.23	0.23	0.23		0.68	0.68	0.68	0.68	0.68	0.68
v/c Ratio		0.81	0.33	0.08	0.62		0.40	0.71	0.00	0.11	0.49	0.09
Control Delay		82.4	15.3	42.4	47.6		6.4	7.5	0.0	11.6	12.2	4.2
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		82.4	15.3	42.4	47.6		6.4	7.5	0.0	11.6	12.2	4.2
LOS		F	B	D	D		A	A	A	B	B	A
Approach Delay		48.3			47.2			7.5			11.6	
Approach LOS		D			D			A			B	
Queue Length 50th (m)		36.8	8.1	4.7	49.2		2.8	27.4	0.0	1.1	85.3	3.9
Queue Length 95th (m)		#78.3	27.8	12.7	81.8		m2.8	62.6	m0.0	3.6	87.9	9.1
Internal Link Dist (m)		139.1			195.9			327.0			495.7	
Turn Bay Length (m)			30.0	10.0			23.0			23.0		25.0
Base Capacity (vph)		187	464	273	410		255	2501	1128	108	2501	1135
Starvation Cap Reductn		0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio		0.78	0.32	0.08	0.59		0.39	0.68	0.00	0.10	0.47	0.09

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 137 (98%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 15.1

Intersection LOS: B

Intersection Capacity Utilization 99.8%

ICU Level of Service F

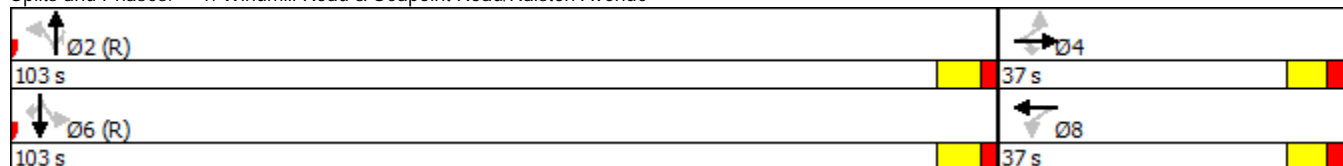
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.
























m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Windmill Road & Seapoint Road/Ralston Avenue



2: Windmill Road & Bancroft Lane/Wright Avenue

2026 PM Peak Hour Volumes with Site Generated Trips and Hwy 107

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	34	133	378	77	478	92	1169	165	225	998	25
Future Volume (vph)	25	34	133	378	77	478	92	1169	165	225	998	25
Satd. Flow (prot)	1789	1657	0	1700	1732	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.950			0.950	0.968		0.180			0.064		
Satd. Flow (perm)	1789	1657	0	1700	1732	1601	339	3579	1601	121	3579	1601
Satd. Flow (RTOR)		109				520			161			129
Lane Group Flow (vph)	27	182	0	247	248	520	100	1271	179	245	1085	27
Turn Type	Split	NA		Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8	2		2	6		6
Total Split (s)	18.0	18.0		44.0	44.0	44.0	12.0	35.0	35.0	43.0	66.0	66.0
Total Lost Time (s)	7.8	7.8		7.8	7.8	7.8	4.0	7.0	7.0	4.0	7.0	7.0
Act Effct Green (s)	9.5	9.5		28.6	28.6	28.6	69.9	58.6	58.6	82.1	67.0	67.0
Actuated g/C Ratio	0.07	0.07		0.20	0.20	0.20	0.50	0.42	0.42	0.59	0.48	0.48
v/c Ratio	0.22	0.85		0.71	0.70	0.70	0.39	0.85	0.23	0.91	0.63	0.03
Control Delay	65.9	59.3		62.8	61.9	9.1	20.4	44.6	7.4	81.3	34.2	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.9	59.3		62.8	61.9	9.1	20.4	44.6	7.4	81.3	34.2	0.2
LOS	E	E		E	E	A	C	D	A	F	C	A
Approach Delay		60.1			35.0			38.7			42.1	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	7.2	20.0		67.4	67.5	0.0	11.8	166.7	2.9	61.9	78.6	0.0
Queue Length 95th (m)	17.1	#59.6		92.4	92.3	30.1	23.0	#265.8	21.1	87.0	157.9	m0.1
Internal Link Dist (m)		86.9			194.0			368.4			327.0	
Turn Bay Length (m)							35.0			70.0		35.0
Base Capacity (vph)	130	221		439	447	799	259	1497	763	535	1713	833
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.82		0.56	0.55	0.65	0.39	0.85	0.23	0.46	0.63	0.03

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 40.0

Intersection LOS: D

Intersection Capacity Utilization 90.7%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Windmill Road & Bancroft Lane/Wright Avenue

